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US Department
of Transportation
**Federal Aviation Administration**

# General Aviation Pilot and Aircraft Activity Survey





Calendar Year 1990







Office of
Management Systems

U.S. Department of Transportation
**Federal Aviation Administration**

# General Aviation Pilot and Aircraft Activity Survey

**Calendar Year 1990**

Technical Report Documentation Page

| 1. Report No. | 2. Government Accession No. | 3. Recipient's Catalog No. |
|---|---|---|
| 4. Title and Subtitle<br>GENERAL AVIATION PILOT AND AIRCRAFT ACTIVITY SURVEY<br>Triannual Summary Report 1990 Data | | 5. Report Date<br>1991<br>6. Performing Organization Code<br>AMS-420 |
| 7. Author(s)<br>Executive Resource Associates, Inc.<br>2011 Crystal Dr. Suite 813<br>Arlington, Virginia 22202 | Subcontractor: Adsystech, Inc.<br>8601 Georgia Ave., Suite 801<br>Silver Spring, MD 20910 | 8. Performing Organization Report No. |
| 9. Performing Organization Name and Address<br>Federal Aviation Administration<br>Office of Management Systems<br>800 Independence Avenue, S.W.<br>Washington, D.C. 20591 | | 10. Work Unit No. (TRAIS)<br>11. Contract or Grant No.<br>DTFA01-88-Y-01026 |
| 12. Sponsoring Agency Name and Address<br>Federal Aviation Administration<br>Office of Management Systems<br>800 Independence Avenue, S.W.<br>Washington, D.C. 20591 | | 13. Type of Report and Period Covered<br>Triannual, Calendar Year 1990<br>14. Sponsoring Agency Code<br>AMS-420 |
| 15. Supplementary Notes | | |


6. Abstract

This report provides a summary and analysis of the data collected in the 1990 General Aviation Pilot and Aircraft Activity Survey. The survey was conducted at a random sample of general aviation airports across the nation during the months of June, July, August, and September 1990 by the Federal Aviation Administration with the assistance of the Civil Air Patrol.

The survey data provide information regarding the magnitude and characteristics of general aviation including: type and source of weather information services, trip length in time and distance, and pilot age and certification. Estimates are made of total 1990 general aviation operations, fuel consumption and aircraft miles flown.


| 17. Key Words | | 18. Distribution Statement | |
|---|---|---|---|
| Aircraft Type, Airport Traffic, Flight Plan, Fuel Consumption, General Aviation Activity, Miles Flown, Pilot Certification, Weather Information | | DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161 | |
| 19. Security Classif. (of this report) | 20. Security Classif. (of this report) | 21. No. of Pages | 22. Price |
| Unclassified | Unclassified | 95 | |

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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| | |
|---|---|
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| Date 1990 information will be available: | July 1991 |
| Date next publication is available: | September 1991 (1990 data) |
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| | |
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| Order from: | U.S. Government Printing Office or National Technical Information Service |
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|---|---|
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| Person to contact: | Nancy Trembley |

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| | |
|---|---|
| Latest edition: | January 1991 |
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| Person to contact: | Alfredia Brooks |

FAA Statistical Handbook of Aviation is a convenient source for historical data. It presents statistical information pertaining to the Federal Aviation Administration, the National Airspace System, Airports, Airport Activity, U.S. Civil Air Carrier Fleet, U.S. Civil Air Carrier Operating Data, Airmen, General Aviation Aircraft, Aircraft Accidents, Aeronautical Production and Import/Export.

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| Person to contact: | Patricia Beardsley |

General Aviation Activity and Avionics Survey is an annual report that presents the results of the general aviation activity and avionics survey conducted to obtain information on the activity and avionics of the U.S. registered general aviation aircraft fleet. The report contains estimated flying time, landings, fuel consumption, lifetime airframe hours, avionics, and engine hours of the general aviation aircraft by manufacturer/model group, aircraft type, state and region of based aircraft, and primary use.

| | |
|---|---|
| Reporting period: | Calendar Year |
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| Person to contact: | Shung-Chai Huang |

U.S. Civil Airmen Statistics is an annual study of detailed airmen statistics. It contains calendar year statistics on pilots and nonpilots and the number of certificates issued.

| | |
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| Date 1990 information is available: | February 1991 |
| Date next publication is scheduled: | April 1991 (1990 data) |
| Person to contact: | Patricia Carter |

# PREFACE

This report presents the results of the 1990 General Aviation Pilot and Aircraft Activity Survey. This survey represents one component of the Federal Aviation Administration's (FAA) efforts to assess, measure, and document the characteristics of general aviation activity and its impact on the National Airspace System (NAS). The survey plan was initiated by the FAA. The survey design, airport sample selection, survey data processing and preparation of this report were performed by Executive Resource Associates, Inc. (ERA) with the assistance of Adsystech, Inc., under the supervision of the Office of Management Standards, Statistical Analysis Branch.

Although the survey was conducted under the auspices of the FAA, the data were collected by the Civil Air Patrol (CAP). The Federal Aviation Administration appreciates the time and efforts of Colonel Ronald M. Hudak, DCS, Operations; Captain John W. Sharp, Chief, Flight Operations Standard Evaluation, CAP National Headquarters; and all United States Air Force CAP Liaison Officers and the CAP Wing Commanders of all 50 states and Puerto Rico, who coordinated the survey operations. Special thanks also go to the thousands of CAP squadron commanders, officers and cadets who performed the on-site data collection. The squadrons which participated in the survey are listed in Appendix C.

Additional thanks go to Mr. Steve Hopkins, Manager of the Statistical Analysis Branch, Management Standards and Statistics Division and his staff--especially Mr. Shung-Chai Huang, the FAA statistician responsible for this survey project, who provided valuable assistance in coordinating with the CAP and who shared his experience from past surveys.

Suggestions and comments about this report are welcome and will be given careful consideration in planning future editions.

Distribution: ZMS-348F; ZMA-411; FFS-1, 7 (MINIMUM); CAP

## EXECUTIVE SUMMARY

This report presents the results of the 1990 General Aviation Pilot and Aircraft Activity Survey. Since the survey was conducted by the Federal Aviation Administration (FAA) with the assistance of the Civil Air Patrol (CAP), the survey is commonly referred to as the FAA/CAP survey. The purpose of the survey is to increase FAA's knowledge of the characteristics of general aviation activity and its impact on the National Airspace System. Current information on general aviation characteristics such as pilot profiles, flight profiles, airport facilities, use of weather information, fuel consumption, aircraft miles flown and traffic volume and patterns were collected.

The FAA/CAP survey was conducted at 252 public-use airports. The airport sample represents a cross-section of airport types and is representative of the FAA regions. Data for the survey were collected for the FAA by almost 250 CAP squadrons around the country using two survey instruments, a Pilot Questionnaire form and a Traffic Count form. Incoming pilots were interviewed using the Pilot Questionnaire form. The Traffic Count form was used to record all general aviation operations on each of two pre-selected dates (one weekday and one weekend day) during the months of June, July, August, and September, 1990. This survey is the sixth in a series of General Aviation Pilot and Aircraft Activity surveys normally conducted at three year intervals by the FAA in association with the CAP. The last survey was conducted in 1984.

The 1990 General Aviation Pilot and Aircraft Activity Survey had six major objectives:

- Develop pilot profiles of the 1990 population of active general aviation pilots;
- Develop general aviation flight profiles;
- Determine to what extent pilots use preflight and inflight weather service information, and what source pilots most often use to obtain weather information;
- Obtain pilots' ratings of the facilities provided at surveyed airports, as well as their facility preferences at destination airports;
- Estimate total fuel consumption and average miles flown in 1989 by the general aviation fleet; and
- Estimate the total number of general aviation operations (take-offs or landings) that occurred in 1990 and determine traffic patterns.

### PILOT PROFILES

The first major objective of the 1990 FAA/CAP survey was to develop general aviation pilot profiles. Basic pilot characteristics such as age, certification,

current instrument rating, aircraft ownership, purpose of flight, and utilization of flight plans form the basis of the survey. In all cases, except pilot hours, data were collected for calendar year 1990. Data on pilot activity and hours flown (local and cross-country) were collected for calendar year 1989. The following observations were made concerning pilot profiles:

- The distribution of pilots interviewed closely approximated the active pilot population.

- In comparison to the active pilot population, it appears that older pilots, particularly those age 40 and over, were the more active pilot groups.

- In general, pilots flew more cross-country flight hours than local flight hours, except for student pilots whose flying was mostly local.

- Pilots making longer flights tend to file flight plans. In 1990, more than 92 percent of pilots making local flights did not file flight plans, but only 31 percent of cross-country pilots did not file flight plans. For flying under IFR, where a flight plan is required, the percentages of pilots filing rose as compared to 1984's survey.

- Pilots appeared to be less active in 1989 than they were in previous years. Compared to the 1981 and 1984 survey results, pilots in all certificate categories flew fewer hours in 1989. Student pilots' flight time in 1989, in particular, was very low, only amounting to 37 percent of its 1983 annual average flight time.

- In all pilot certificate categories except student pilots and foreign pilots, the ratio of pilots who reported that they flew in 1989 remained similar to the ratios reported in 1983. The percent of student pilots who indicated that they flew in 1989 increased from 24.8 percent in 1984's survey to 51.4 percent in the 1990 survey; the percent of foreign pilots increased from 36.9 percent in 1984's survey to 94.1 percent in the 1990 survey.

- Of the pilots interviewed, more than 47 percent indicated that they owned their aircraft.

## FLIGHT PROFILES

The second major objective of the 1990 FAA/CAP survey was to develop flight profiles by aircraft type. Several flight characteristics such as time, speed, altitude, distance, landings per flight, type of flight, purpose of trip and load factor were examined along with Mode C capability. It was found that the distribution of types of aircraft among the surveyed and active aircraft population remained fairly constant since 1984. The distribution between local and cross-country flights also remained virtually unchanged from 1984. In 1990,

68 percent of all flights were cross-country and 32 percent were local, as compared to 66 percent cross-country and 34 percent local in 1984.

- Over the past ten years, the general aviation load factor has changed little for both local and cross-country flights.

- Flight characteristics varied with the purpose of the trip. Aerial application and industrial flights averaged the greatest local flight times. Executive/corporate and industrial cross-country flights averaged the longest distance.

- The frequency distribution of cross-country flight versus local flight was 2 to 1.

- More than 90 percent of the pilots interviewed indicated that they did not have any problems using Mode C.

## UTILIZATION OF WEATHER INFORMATION SERVICE

A third major objective of the FAA/CAP survey was to determine to what extent pilots use preflight and inflight weather service information, and what source pilots most often use to obtain weather information. Preflight and inflight weather information is available to pilots from the FAA as well as other sources, such as radio, television and newspapers. The extent to which the FAA and other sources of weather information were utilized by pilots is considered by purpose and type of flight, pilot certification, and type of aircraft.

- In cross-country flights, close to 80 percent of all pilots obtained weather information from FAA sources. Of those pilots who obtained inflight weather information for cross-country flight, nearly 97 percent used FAA sources.

- From 1984 to 1990, the proportion of pilots using FAA inflight weather information service increased by over 100 percent for local flights and increased by 38 percent for cross-country flights.

- Pilots who did not obtain preflight weather information from any available source for cross-country flight decreased from 9.0 percent in 1984 to 6.4 percent in 1990. This ratio also decreased for local flight, from 35.6 percent in 1984 to 32.0 percent in 1990.

## AIRPORT FACILITY RATINGS AND PREFERENCES

The fourth major objective of the 1990 FAA/CAP survey was to obtain pilots' ratings of the facilities provided at the surveyed airports, as well as their facility preferences at destination airports. The survey was conducted at general aviation public-use airports. Services available at these public-use airports varied considerably. The survey found that:

- Overall, the interviewed pilots replied that most of their facility requirements were met very well at the survey site airport.

- The facilities most preferred at a destination airport were Fixed Base Operator (FBO) service (88.0 percent) and runway lighting (87.9 percent).

## FUEL CONSUMPTION AND AIRCRAFT MILES FLOWN

The fifth objective of the 1990 FAA/CAP survey was to estimate total fuel consumption and average miles flown in 1989 by the general aviation fleet. Fuel consumption for each aircraft type was calculated by multiplying the total hours flown in 1989 by the average amount of fuel consumed in 1989 for each aircraft type. Miles flown were calculated using a combination of survey data and data obtained from the FAA's 1989 General Aviation Activity and Avionics Survey. The survey found that:

- In 1989, general aviation flying (excluding rotorcraft) consumed an estimated 341.8 million gallons of aviation gasoline and 738.7 million gallons of jet fuel.

- The general aviation fleet flew an estimated 4,764 million nautical miles in 1989.

## TOTAL 1990 GENERAL AVIATION OPERATIONS AND TRAFFIC PATTERNS

The last objective of the 1990 FAA/CAP survey was to estimate the total number of general aviation operations (take-offs or landings) that occurred in 1990 and to determine traffic patterns. Traffic count form data were used to derive estimates of daily operations for each of four airport types: 1) towered; 2) non-towered, paved and lighted; 3) non-towered, paved and unlighted; and 4) non-towered and unpaved. The following observations were made:

- The average number of daily operations for towered airports was 227, while the average for non-towered airports was 49.

- The estimate of total general aviation operations at public-use airports was 128.6 million.

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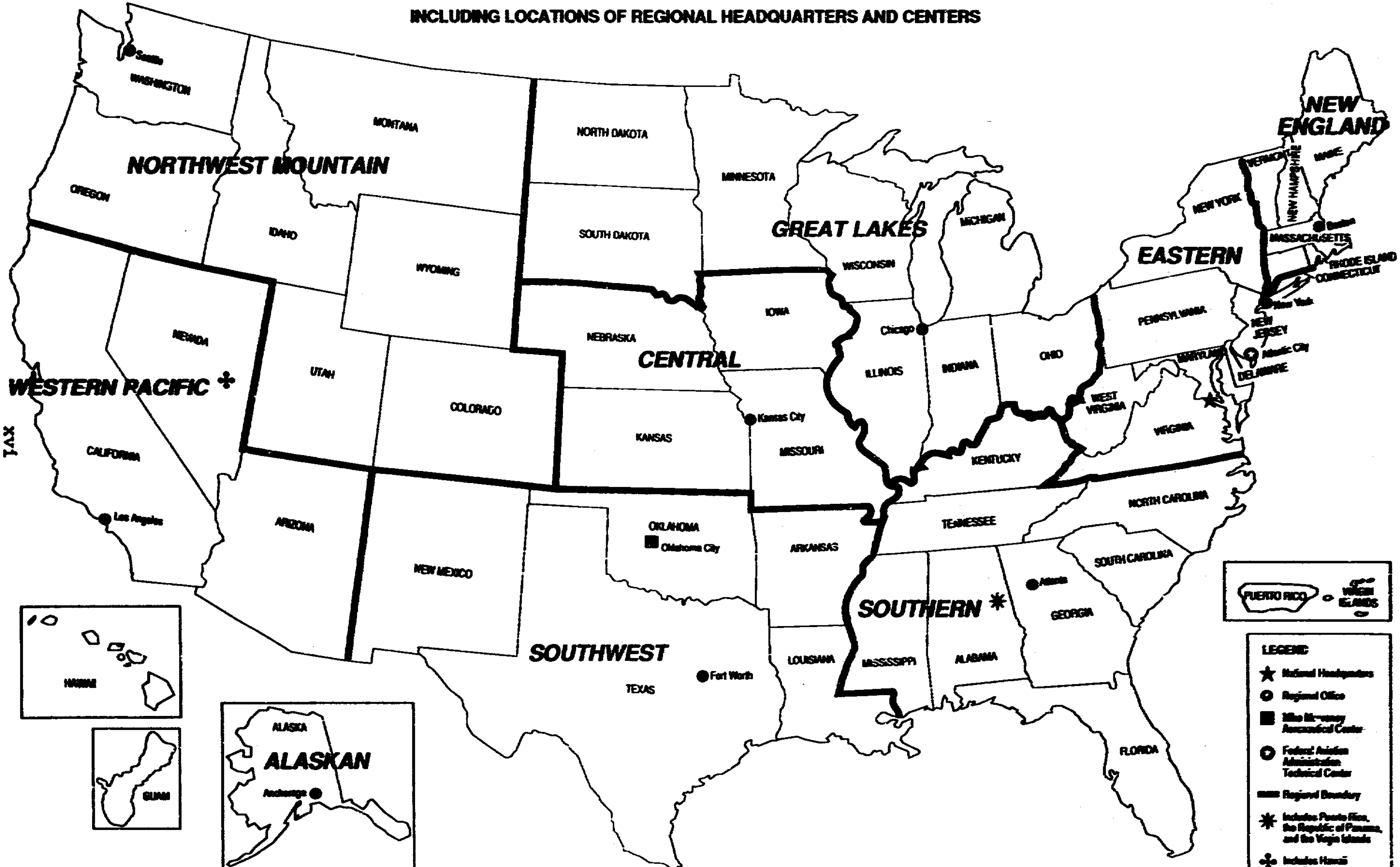
# FAA REGIONAL BOUNDARIES

INCLUDING LOCATIONS OF REGIONAL HEADQUARTERS AND CENTERS



# CHAPTER I

# INTRODUCTION

## A. BACKGROUND

The 1990 General Aviation Pilot and Aircraft Activity Survey was conducted by the Federal Aviation Administration (FAA) with the assistance of the Civil Air Patrol (CAP). The survey is hereafter referred to as the FAA/CAP Survey. The purpose of the survey is to increase FAA's knowledge of the characteristics of general aviation activity and its impact on the National Airspace System. Current information on general aviation characteristics such as pilot profiles, flight profiles, airport facilities, use of weather information, fuel consumption, aircraft miles flown and traffic volume and patterns were collected.

The data collected in this survey are unique, for no other FAA data collection activity collects information from the on-site pilot. This survey is also the only data collection effort which attempts to measure on a national level the extent of general aviation aircraft operations at non-towered airports.

The 1990 FAA/CAP survey is the sixth in a series of General Aviation Pilot and Aircraft Activity surveys conducted triennially. The first survey, conducted in 1972, was limited in scope to an examination of pilot and aircraft characteristics. The scope of the 1975, 1978, 1981, and 1984 surveys was expanded to include an examination of all general aviation activities occurring at the surveyed airports. The 1990 survey is modeled after these preceding surveys (no survey was conducted in 1987). Several additional questions were added to the 1990 pilot questionnaires to obtain pilots' opinions about current and desired airport facilities, and Mode C capability.

## B. OBJECTIVES

The 1990 General Aviation Pilot and Aircraft Activity Survey had six major objectives. These objectives were to: 1) develop pilot profiles; 2) develop flight profiles; 3) determine to what extent pilots use preflight and inflight weather information, and what source pilots most often use; 4) obtain pilots' ratings of facilities provided at the surveyed airports, as well as their facility preferences at destination airports; 5) estimate general aviation fuel consumption and miles flown; and 6) estimate the total number of 1990 general aviation operations (take-offs or landings) and identify patterns in general aviation traffic. The survey also sought to identify changes in general aviation activity by comparing this year's results with the results from previous surveys.

C. ``THODOLOGY

To · ʌnplish these objectives, data were collected on the population of active general aviation pilots and the number of general aviation operations that occurred in 1990. In addition, data were collected on whether the pilots interviewed were active in 1989 and how many hours they flew (local and cross-country) in 1989.

Almost 250 CAP squadrons nationwide collected the survey data using two survey instruments, the Pilot Questionnaire form and the Traffic Count Form. During the months of June, July, August, and September of 1990, 5,235 incoming pilots were interviewed at 252 randomly selected airports in 50 states and Puerto Rico using the Pilot Questionnaire form. Approximately 82 percent of the pilots approached by the CAP cadets responded to the survey. The Traffic Count form was used to derive the number of general aviation operations at the 252 airports surveyed out of a sample size of 420 airports. The results of this survey are based on an analysis of the information received from these pilots and the number of general aviation operations at these airports.

D. ANALYSIS

The data were analyzed to provide pilot profiles, flight profiles, preflight and inflight weather information usage, fuel consumption and average miles flown, airport facility preferences, and estimates of general aviation operations and traffic patterns in 1990. Comparisons of the data with the 1981 and 1984 surveys' data were made in order to determine if any major changes in pilot or flight characteristics have occurred over time.

Apart from a general descriptive analysis of the data, several issues were considered in developing the pilot and flight profiles. These included analyzing the extent of use of FAA services and facilities for obtaining weather information, the extent of filing flight plans by pilots, and estimates of fuel consumption and total miles flown by the entire general aviation population.

The data in the Traffic Count forms were used to derive estimates of the annual general aviation operations for each of the four types of airports included in the study:

1) Towered;

2) Non-towered, paved and lighted (with at least one paved runway);

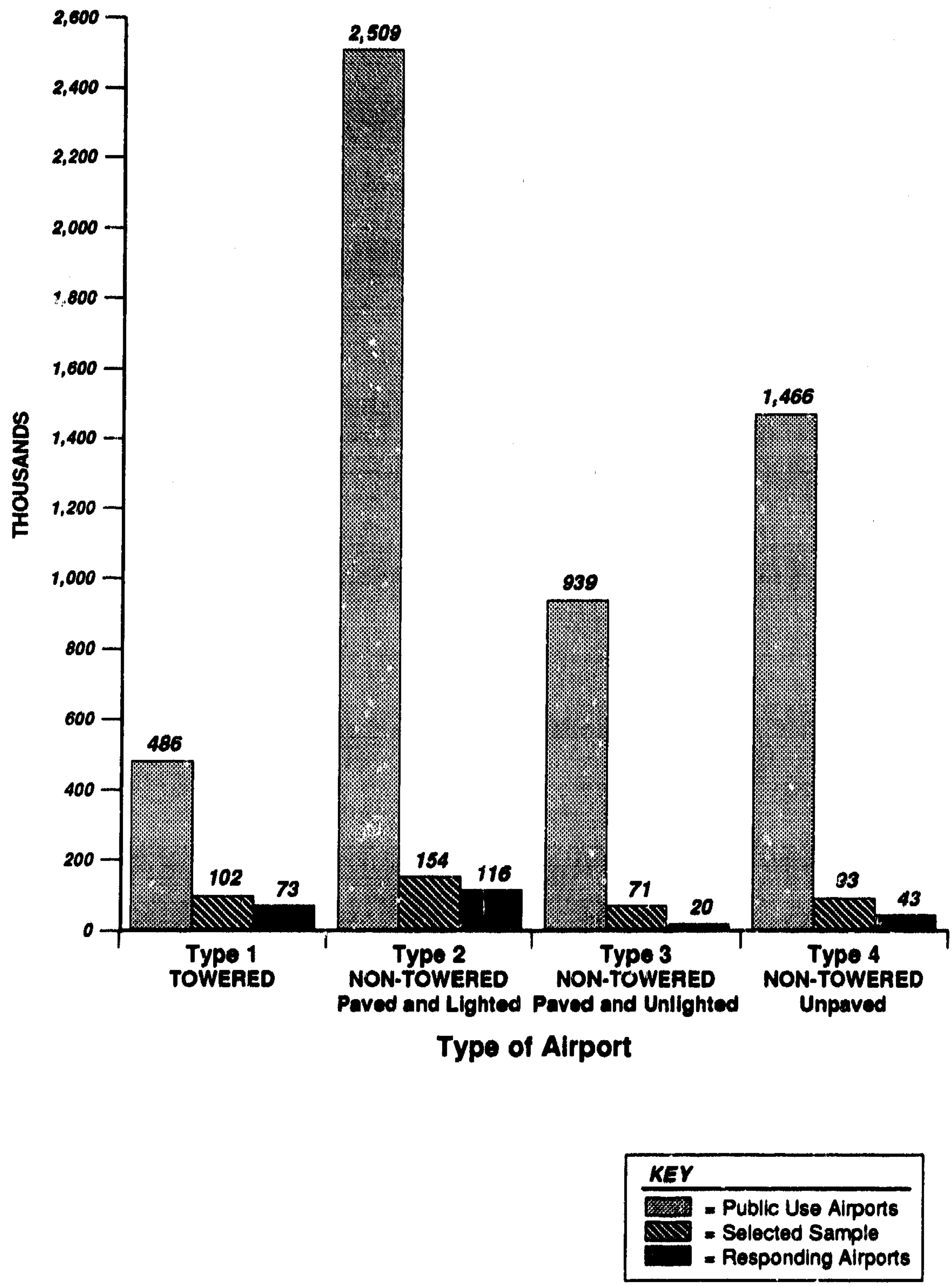
3) Non-towered, paved and unlighted (with at least one paved runway); and

4) Non-towered, unpaved.

Figure 1.1 on the following page displays the number of public-use airports, the selected sample and the number of responding airports by airport type.

## Figure 1.1

# 1990 GENERAL AVIATION PILOT AND AIRCRAFT ACTIVITY SURVEY PARTICIPATION BY TYPE OF AIRPORT



The survey data were adjusted to account for seasonal bias in the data collection. In order to calculate the seasonal adjustments, actual general aviation traffic data for Type 1 airports (towered) were extracted from the FAA's Air Traffic Reporting System files. These data were grouped by fiscal quarter and FAA Region. Processing this grouped data through the series module of SYSTAT (the statistical software package used for the analysis of the survey data) provided seasonal adjustment factors which were applied to the raw survey data in order to remove the seasonal bias.

## E. REPORT LAYOUT

The results of the 1990 General Aviation Pilot and Aircraft Activity Survey are presented in six chapters.

Chapter II, **Pilot Profiles**, develops a pilot profile based on pilot characteristics such as age, certification, current instrument rating, aircraft ownership, purpose of flight, and utilization of flight plans.

Chapter III, **Flight Profiles**, develops flight profiles based on characteristics such as time, speed, altitude, distance, landings per flight, type of flight, Mode C capability, purpose of trip and load factor.

Chapter IV, **Utilization of Weather Information Service**, determines the extent to which pilots use preflight and inflight weather information, and what sources pilots most often use to obtain weather information.

Chapter V, **Airport Facility Ratings and Preferences**, presents pilots' ratings of facilities provided at the surveyed airports, as well as their facility preferences at destination airports.

Chapter VI, **Fuel Consumption and Aircraft Miles Flown**, estimates the total fuel consumption of the general aviation fleet and total nautical miles flown in 1989.

Finally, Chapter VII, **Total 1990 General Aviation Operations and Traffic Patterns**, estimates the total number of general aviation operations (takeoffs and landings) that occurred in 1990 and determines traffic patterns.

This report also contains four appendices. Appendix A contains the details of the sampling plan and the statistical methodologies employed during this survey. Appendix B contains copies of the survey forms. Appendix C provides a list of participating CAP squadrons, and Appendix D contains a list of common acronyms, as well as a glossary of aviation terms found in this report.

# CHAPTER II

## PILOT PROFILES

One of the major objectives of the 1990 FAA/CAP Survey is to develop pilot profiles of the 1990 population of active general aviation pilots. Through the use of the Pilot Questionnaire form (see Appendix B, page B-1), data were collected on such characteristics as pilot age, certification, current instrument rating, aircraft ownership, hours flown, speed, landings, purpose of flight and utilization of flight plans. Frequency distributions were then generated from the data provided by the interviewed pilots, and pilot profiles were developed. This chapter presents the pilot profiles of the 1990 active general aviation pilots.

Active airmen, as defined by the FAA's Airmen Certification records, are those airmen who hold both an airman certificate and a valid medical certificate. In the case of multiple certification, a pilot was classified according to the highest rating certificate he or she held, with the highest rating being the airline transport pilot (ATP) certificate followed by commercial, private, student or other certificate. Although data for the recreational certificate was collected, only two out of more than 5,000 pilots interviewed indicated they held a recreational certificate. This is most likely due to the relative newness of the recreational certificate. However, all survey responses citing the recreational certificate have been placed in the "other" pilot certificate category so as not to bias the results.

The percentage distributions of pilot certificate by active pilot population (as of December 31, 1989) and pilot interviews are provided in Table 2.1 on the following page. Figure 2.1 on page 2-3 displays the percentage distribution of pilot interviews by type of pilot certificate.

Table 2.1 indicates that the greatest percentage of pilots interviewed held private certificates, 41.7 percent, which is close to the percentage holding private certificates among the active pilot population, 41.9 percent. The second largest portion of pilots interviewed, 31.3 percent, held commercial certificates. The percentage of pilots interviewed with commercial certificates (31.3 percent) was overrepresented in the survey compared to the percentage of pilots with commercial certificates in the active pilot population (20.6 percent). The percentage of pilots interviewed with student certificates (10.8 percent) was underrepresented in the survey in comparison to the number of student certificates held in the active pilot population (20.4 percent).

TABLE 2.1 PERCENTAGE DISTRIBUTION OF ACTIVE PILOT POPULATION, PILOT INTERVIEWS AND AIRCRAFT OWNERSHIP BY PILOT CERTIFICATE

| PILOT CERTIFICATE | ACTIVE PILOT POPULATION[1] | PILOT INTERVIEWS | PRIVATE AIRCRAFT OWNERSHIP |
|---|---|---|---|
| STUDENT | 20.4 | 10.8 | 3.7 |
| PRIVATE | 41.9 | 41.7 | 59.1 |
| COMMERCIAL | 20.6 | 31.3 | 29.0 |
| ATP | 14.6 | 15.9 | 8.0 |
| FOREIGN | 0.0 | 0.3 | 0.2 |
| OTHER | 2.5 | 0.0 | 0.0 |
| TOTAL | 100.0 | 100.0 | 100.0 |

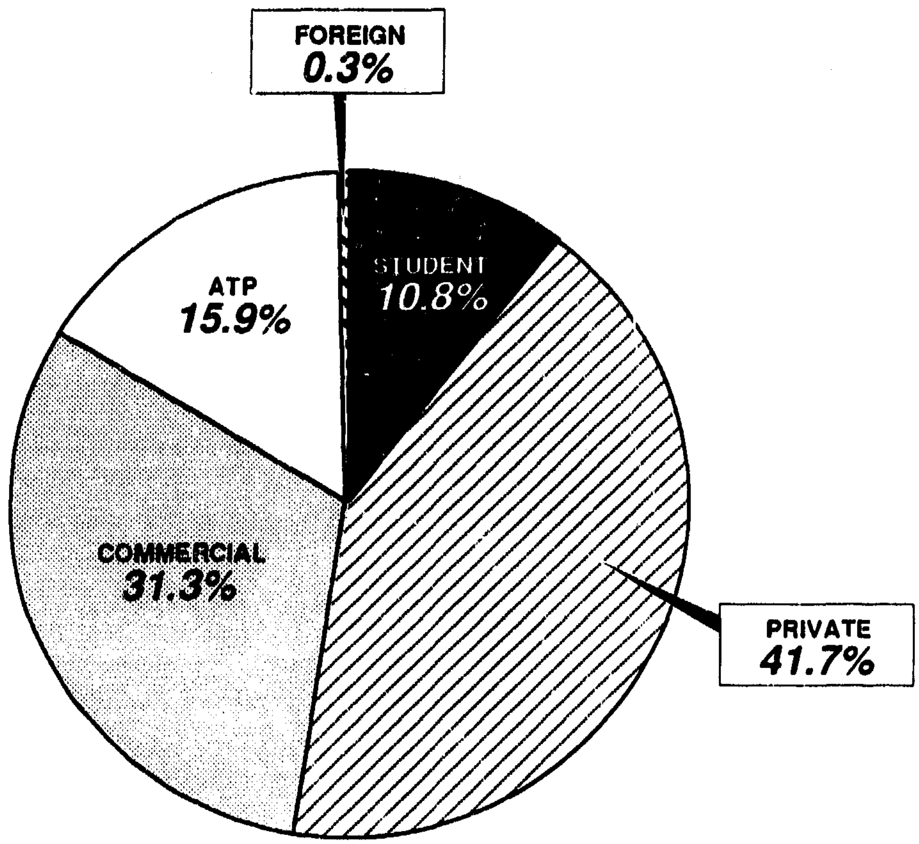
Table 2.1 also presents the percentage distribution of aircraft ownership by pilot certificate. For those pilots owning their own aircraft, over 59 percent held private certificates. This is a 17.5 percent increase from the 1984 survey where only 41.5 percent of pilots owning their own airplanes held private certificates. The percentage of commercial and air transport pilots owr their own aircraft decreased from 1984's figures of 37.1 and 15.5 cent, respectively.

A comparison of the 1990 data with the results of the 1984 and 1981 surveys shows that there have been no noticeable changes in the sample distribution of pilot certificate categories. The overrepresentation of pilots with commercial certificates and the underrepresentation of pilots with student certificates have also remained at similar levels over the years. It should be noted in this connection that, in non-student general aviation flying, commercial pilots are the most active group of pilots, followed by ATP and private pilots. Student pilots are the least active pilot group.

[1]"1989 U.S. Civil Airmen Statistics," U.S. Department of Transportation, Federal Aviation Administration (Washington, D.C., 1990), p. 6.

**Figure 2.1**

**PERCENTAGE OF PILOT INTERVIEWS BY TYPE OF PILOT CERTIFICATE**




*SOURCE: Table 2.1*

Table 2.2, below, presents the percentage distributions of the active pilot population, pilot interviews, the percentage of airports open to the public, and the percentage of airports which participated in the survey by FAA region. The greatest percentages of pilot interviews were conducted in the Southern region (21.3 percent), the Great Lakes region (16.8 percent), and the Eastern region (15.3 percent). The three regions with the highest percentage of participating airports are the Southern region, with 16.2 percent; the Great Lakes region, with 16.0 percent; and the Northwest Mountain region, with 15.0 percent.

**TABLE 2.2 PERCENTAGE DISTRIBUTION OF PILOT INTERVIEWS, PARTICIPATING AIRPORTS AND THEIR RESPECTIVE POPULATION DISTRIBUTION BY FAA REGION**

| FAA REGION | ACTIVE PILOT POPULATION[2] | PILOT INTERVIEWS | AIRPORTS OPEN TO PUBLIC[3] | PARTICIPATING AIRPORTS[4] |
|---|---|---|---|---|
| ALASKAN | 1.4 | 2.5 | 6.0 | 2.6 |
| CENTRAL | 5.0 | 5.5 | 9.9 | 6.2 |
| EASTERN | 13.1 | 15.3 | 10.0 | 12.8 |
| GREAT LAKES | 16.4 | 16.8 | 20.7 | 16.0 |
| NEW ENGLAND | 4.9 | 10.6 | 3.4 | 5.7 |
| NORTHWEST MOUNTAIN | 9.3 | 10.9 | 11.9 | 15.0 |
| SOUTHERN | 17.4 | 21.3 | 15.0 | 16.2 |
| SOUTHWEST | 11.7 | 8.8 | 15.3 | 11.2 |
| WESTERN PACIFIC | 17.4 | 8.3 | 7.8 | 14.3 |
| OTHER | 3.4 | 0.0 | 0.0 | 0.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 |

[2] "1989 U.S. Civil Airmen Statistics," U.S. Department of Transportation, Federal Aviation Administration (Washington, D.C., 1990), pp. 6-7.

[3] According to data extracted in 1990 from the Airport Master File, maintained by the National Flight Data Center of the FAA.

[4] Represents airports which participated in the survey.

Table 2.3, below, presents the percentage age distribution of the active pilot population in 1990 and of the pilots interviewed in the survey. These data show close similarity between the two distributions. Figure 2.2 on page 2-6 displays the percentage distribution of interviewed pilots by pilot age. The majority of pilots interviewed were 40-44 years old. The smallest percentage of pilots interviewed were under 16 years old.

In comparison to the active pilot population, it appears that older pilots, particularly those age 40 and over, were the more active pilot groups. A comparison of the percentage age distributions of pilots interviewed in the 1978, 1981, 1984, and 1990 surveys portrays an apparent aging of the active pilot population. The percentage of active pilots over 60 years of age increased 43 percent over the past decade. This increase is reflected in the interviewed populations where the percentage of pilots interviewed over 60 years of age increased from 3.0 percent in 1978, to 4.6 percent in 1981, to 7.8 percent in 1984 and to a high of 10.6 percent in the 1990 survey. Percentage distributions among the other age categories have remained fairly constant over time.

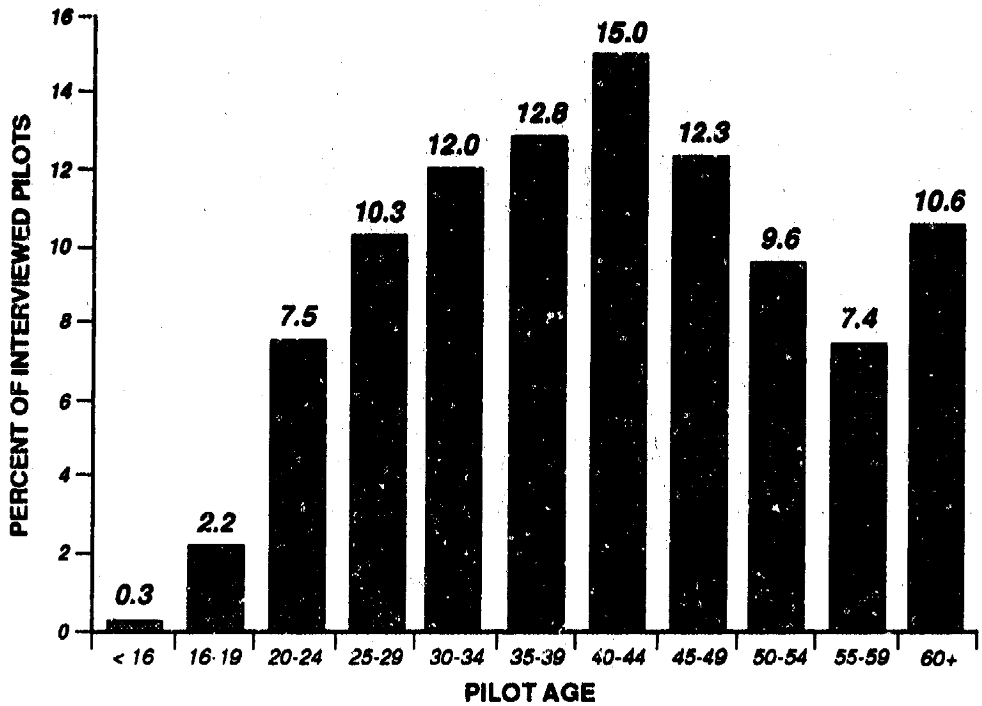
**TABLE 2.3 PERCENTAGE DISTRIBUTION OF ACTIVE PILOT POPULATION AND PILOT INTERVIEWS BY PILOT AGE**

| PILOT AGE | ACTIVE PILOT POPULATION[5] | PILOT INTERVIEWS |
|---|---|---|
| UNDER 16 | 0.0[6] | 0.3 |
| 16-19 | 2.8 | 2.2 |
| 20-24 | 7.9 | 7.5 |
| 25-29 | 11.8 | 10.3 |
| 30-34 | 13.7 | 12.0 |
| 35-39 | 13.9 | 12.8 |
| 40-44 | 14.1 | 15.0 |
| 45-49 | 11.4 | 12.3 |
| 50-54 | 8.4 | 9.6 |
| 55-59 | 6.7 | 7.4 |
| 60 AND OVER | 9.3 | 10.6 |
| TOTAL | 100.0 | 100.0 |

[5] "1984 U. S. Civil Airmen Statistics," U.S. Department of Transportation, Federal Aviation Administration (Washington, D.C., 1989), p. 13.

[6] Insignificant number of active pilots under 16 years old (approximately 0.03 percent).

## Figure 2.2
# PERCENTAGE DISTRIBUTION OF PILOT INTERVIEWS BY PILOT AGE




*SOURCE: Table 2.3*

Table 2.4, below, gives the percentage distribution of current instrument ratings by type of pilot certificate of pilots interviewed. Current instrument ratings were held by 98.7 percent of all ATP pilots surveyed. In contrast, only 40.1 percent of all pilots surveyed with private certificates held current instrument ratings.

TABLE 2.4 PERCENTAGE DISTRIBUTION OF CURRENT INSTRUMENT RATING OF PILOTS INTERVIEWED BY PILOT CERTIFICATE

| PILOT CERTIFICATE | CURRENT INSTRUMENT RATING | |
|---|---|---|
| | YES | NO |
| STUDENT | 0.0 | 100.0 |
| PRIVATE | 40.1 | 59.9 |
| COMMERCIAL | 92.9 | 7.1 |
| ATP | 98.7 | 1.3 |
| FOREIGN | 95.1 | 4.9 |
| ALL CERTIFICATES[7] | 77.9 | 22.1 |

In addition to collecting data on the personal characteristics of the pilots interviewed, their flight activities were ascertained as part of the pilot's profile. Pilots were requested to supply information about the number of hours flown during the previous year (1989) for both local and cross-country flights. A local flight is one that takes place within 20 miles of the airport. Cross-country flights are flights greater than 20 miles.

Table 2.5 on the following page shows, by pilot certificate, the total average hours flown in 1989, the average hours in local and cross-country flight, and the percentage distribution of each type of flight for interviewed pilots. As one might expect, commercial and ATP pilots logged in the greatest number of hours flown in 1989 for domestic pilots. ATP pilots flew an average of 567 hours in 1989, with almost 80 percent of the time in cross-country flight. Student pilots were the only ones to fly more local than cross-country hours, averaging 23 local hours compared to 5 average cross-country hours.

In comparison with the 1984 survey, the 1990 survey showed a decrease in the average annual number of hours flown by all types of pilots. Students showed a 63 percent decrease from an average of 76 hours flown in 1983 to an average of 28 hours flown in 1989; their local hours decreased from 60 hours in 1983 to

[7] Does not include recreational certificates.

23 hours in 1989. Private pilots' average annual hours decreased from 236 hours in 1983 to 117 hours in 1989. Commercial pilots showed a 39 percent decrease in their average number of hours flown, from an average of 613 hours in 1983 to an average of 376 hours in 1989. The average number of hours flown by ATP pilots also decreased from 672 hours in 1983 to 567 hours in 1989, and foreign pilots hours decreased from 717 to 524 hours over the same time period.

TABLE 2.5 LOCAL, CROSS-COUNTRY AND TOTAL AVERAGE ANNUAL HOURS FLOWN IN 1989 BY PILOT CERTIFICATE

| PILOT CERTIFICATE | TOTAL AVERAGE ANNUAL HOURS | AVERAGE ANNUAL HOURS FLOWN | | | |
|---|---|---|---|---|---|
| | | LOCAL | | CROSS-COUNTRY | |
| | | HOURS | % TOTAL | HOURS | % TOTAL |
| STUDENT | 28.3 | 23.1 | 81.6 | 5.2 | 18.4 |
| PRIVATE | 117.4 | 50.5 | 43.0 | 66.9 | 57.0 |
| COMMERCIAL | 376.4 | 164.8 | 43.8 | 211.5 | 56.2 |
| ATP | 567.1 | 114.0 | 20.1 | 453.0 | 79.9 |
| FOREIGN[8] | 524.3 | 89.0 | 17.0 | 435.3 | 83.0 |

The survey also sought to determine the extent to which pilots filed flight plans. A general aviation pilot may file a flight plan with an FAA Flight Service Station or an Air Traffic Control Facility prior to takeoff or while inflight. The purpose of a flight plan is to inform the FAA about the destination, direction and route of a flight so that available airspace can be monitored and, in the event of an overdue aircraft, search procedures can be initiated. Two types of flight plans can be filed: Instrument Flight Rules (IFR) and Visual Flight Rules (VFR). In some instances, both IFR and VFR may be filed. Filing IFR means that the pilot must be under the direction of ground-based controllers at all times while in flight. Flying under VFR does not have that requirement. The percentage utilization of flight plans for both local and cross-country flights are presented in Table 2.6, on the following page, by type of pilot certificate.

[8]Extremely low representation in survey sample.

TABLE 2.6 PERCENTAGE UTILIZATION OF FLIGHT PLAN BY TYPE OF FLIGHT AND BY PILOT CERTIFICATE

| LOCAL FLIGHT PLAN | | | | PILOT CERTIFICATE | CROSS-COUNTRY FLIGHT PLAN | | | |
|---|---|---|---|---|---|---|---|---|
| NONE | IFR | VFR | COMP[9] | | NONE | IFR | VFR | COMP |
| 96.6 | 0.4 | 3.0 | 0.0 | STUDENT | 17.8 | 3.2 | 79.0 | 0.0 |
| 96.1 | 1.8 | 2.1 | 0.0 | PRIVATE | 59.5 | 22.4 | 17.8 | 0.3 |
| 93.5 | 2.7 | 3.8 | 0.0 | COMMERCIAL | 32.8 | 47.4 | 19.2 | 0.6 |
| 80.1 | 15.4 | 4.5 | 0.0 | ATP | 16.2 | 72.2 | 11.3 | 0.3 |
| 100.0 | 0.0 | 0.0 | 0.0 | FOREIGN[10] | 3.0 | 96.8 | 0.2 | 0.0 |
| 92.6 | 4.1 | 3.3 | 0.0 | ALL CERTIFICATES | 30.6 | 51.7 | 17.3 | 0.4 |

As expected, the percentage of pilots who did not file a flight plan for local flights was very high, 92.6 percent, as compared to 91.1 percent in the 1984 survey. Of those pilots making a cross-country flight, 30.6 percent did not file a flight plan, as compared to 44.5 percent in the 1984 survey. It should be noted that the changes in proportions of total flight plans filed in 1990 do not indicate that the frequency of filing a flight plan has increased since the last survey in 1984. The 1990 survey only confirmed that, of the total percentage of flight plans filed, the percentage of filing an IFR flight plan has increased as compared with the 1983 statistics.

Table 2.7, on the following page, presents the percentage distribution of pilots who flew in 1989 by type of pilot certificate. Almost all ATP pilots (99.6 percent) surveyed flew in the previous year, which equals the percentage of ATP pilots who flew the previous year (1983) in the 1984 survey. More pilots flew in 1989 than in 1983 for every pilot certificate category (except ATP). The most significant increases were in the number of foreign and student pilots. The percent of student pilots who indicated that they flew in the previous year increased from 24.8 percent in 1984's survey to 51.4 percent in the 1990 survey; the percent of foreign pilots increased from 36.9 percent in 1984's survey to 94.1 percent in the 1990 survey.

[9]Composite: Use of both IFR and VFR Flight Plans.

[10]Extremely low representation in survey sample.

**TABLE 2.7 PERCENTAGE DISTRIBUTION OF PILOTS WHO FLEW/DID NOT FLY IN 1989 BY PILOT CERTIFICATE**

| PILOT CERTIFICATE | FLEW IN 1989 | DID NOT FLY IN 1989 |
|---|---|---|
| STUDENT | 51.4 | 48.6 |
| PRIVATE | 95.9 | 4.1 |
| COMMERCIAL | 98.5 | 1.5 |
| ATP | 99.6 | 0.4 |
| FOREIGN | 94.1 | 5.9 |
| TOTAL | 92.5 | 7.5 |

The relationship between the type of pilot certificate and the source of aircraft was also examined and is presented in Table 2.8, below. Private ownership of aircraft was reported by 66.8 percent of all pilots holding private certificates. Conversely, the majority of pilots in the student category, 72.1 percent, indicated that their aircraft were rented, leased, or obtained from a flying club.

**TABLE 2.8 PERCENTAGE DISTRIBUTION OF SOURCE OF AIRCRAFT BY PILOT CERTIFICATE**

| SOURCE OF AIRCRAFT | PILOT CERTIFICATE | | | | |
|---|---|---|---|---|---|
| | STUDENT | PRIVATE | COMMERCIAL | ATP | ALL CERTIFICATES |
| OWNER/ PARTNER | 16.1 | 66.8 | 43.4 | 23.8 | 47.2 |
| RENTAL, FLYING CLUB, LEASED | 72.1 | 24.8 | 27.7 | 15.8 | 29.5 |
| CORPORATE | 2.5 | 5.0 | 16.1 | 41.6 | 13.8 |
| GOVERNMENT | 0.5 | 1.2 | 3.4 | 4.1 | 2.3 |
| OTHER | 8.8 | 2.2 | 9.4 | 14.7 | 7.2 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

In analyzing local flight characteristics by type of pilot certificate, three variables were considered: 1) landings per flight; 2) flight time; and 3) flight speed. These data are presented in Table 2.9 on the following page.

**TABLE 2.9 AVERAGE LOCAL FLIGHT CHARACTERISTICS BY PILOT CERTIFICATE**

| PILOT CERTIFICATE | AVERAGE LOCAL FLIGHT CHARACTERISTICS | | |
|---|---|---|---|
| | LANDINGS PER FLIGHT | FLIGHT TIME (MINUTES) | FLIGHT SPEED (KNOTS) |
| STUDENT | 4.1 | 73.6 | 87.5 |
| PRIVATE | 2.4 | 65.6 | 106.1 |
| COMMERCIAL | 3.1 | 74.8 | 104.3 |
| ATP | 2.6 | 69.4 | 121.0 |
| FOREIGN | 2.0 | 65.0 | 100.0 |

The local flight characteristics by pilot certificate appeared very similar to those reported in the 1984 and 1981 surveys. In 1990, student pilots averaged the greatest number of landings per flight, 4.1. Average local flight times across all pilot certificate types were relatively close together, ranging from a low of 65 minutes in the foreign category to a high of 75 minutes in the commercial certificate category. Average local flight speeds varied considerably by type of pilot certificate, from a low of 87.5 knots per hour in the student certificate category to a high of 121.0 knots per hour in the ATP category.

In analyzing cross-country flights, the following three variables were considered: 1) last leg distance; 2) last leg time; and 3) total trip distance. These data are presented in Table 2.10, below.

**TABLE 2.10 AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS BY PILOT CERTIFICATE**

| PILOT CERTIFICATE | AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS | | |
|---|---|---|---|
| | LAST LEG DISTANCE (NAUTICAL MILES) | LAST LEG TIME (MINUTES) | TOTAL TRIP DISTANCE (NAUTICAL MILES) |
| STUDENT | 88.5 | 97.3 | 146.2 |
| PRIVATE | 165.4 | 96.6 | 235.7 |
| COMMERCIAL | 190.4 | 89.5 | 273.6 |
| ATP | 297.3 | 84.0 | 403.5 |
| FOREIGN | 240.5 | 77.8 | 362.4 |

The 1990 cross-country flight characteristics by type of pilot certificate also appear similar to those in the 1984 and 1981 surveys. In 1990 cross-country flights, ATP and foreign pilots averaged the greatest number of miles per trip, with 404 and 362 miles, respectively. Student pilots averaged the shortest total trip distance per cross country flight, 146 nautical miles.

The remaining tables and figures in this chapter provide more insight into the personal characteristics of the interviewed pilot population. Table 2.11, below, presents information on the relationship between pilot age and pilot certificate.

TABLE 2.11 PERCENTAGE DISTRIBUTION OF PILOT CERTIFICATE BY PILOT AGE

| PILOT AGE | PILOT CERTIFICATE | | | | | |
|---|---|---|---|---|---|---|
| | STUDENT | PRIVATE | COMMERCIAL | ATP | FOREIGN | TOTAL |
| UNDER 16[11] | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 100.0 |
| 16-19 | 63.5 | 29.9 | 5.6 | 1.0 | 0.0 | 100.0 |
| 20-24 | 24.1 | 26.2 | 45.6 | 3.9 | 0.2 | 100.0 |
| 25-29 | 13.5 | 28.6 | 41.0 | 16.4 | 0.5 | 100.0 |
| 30-34 | 13.6 | 37.4 | 31.9 | 16.8 | 0.3 | 100.0 |
| 35-39 | 13.3 | 44.2 | 24.3 | 17.6 | 0.6 | 100.0 |
| 40-44 | 6.2 | 45.2 | 26.4 | 21.6 | 0.6 | 100.0 |
| 45-49 | 4.9 | 48.2 | 26.5 | 20.1 | 0.3 | 100.0 |
| 50-54 | 5.0 | 40.9 | 36.6 | 17.5 | 0.0 | 100.0 |
| 55-59 | 5.5 | 49.3 | 32.6 | 12.6 | 0.0 | 100.0 |
| 60 AND OVER | 2.9 | 52.7 | 32.3 | 12.1 | 0.0 | 100.0 |
| ALL PILOTS | 10.8 | 41.7 | 31.3 | 15.9 | 0.3 | 100.0 |

The data in Table 2.11 show that private certificates were the most common, 41.7 percent, followed by commercial with 31.3 percent and ATP, with 15.9 percent. A greater percentage of pilots over 29 years of age held private certificates than any other type of certificate. As one might expect, the younger the pilot, the more likely he or she was to hold a student pilot certificate.

[11]Extremely low representation in survey sample.

A significant relationship was found to exist between pilot age and reported ownership as shown in Table 2.12, below.

TABLE 2.12 PERCENTAGE DISTRIBUTION OF SOURCE OF AIRCRAFT BY PILOT AGE

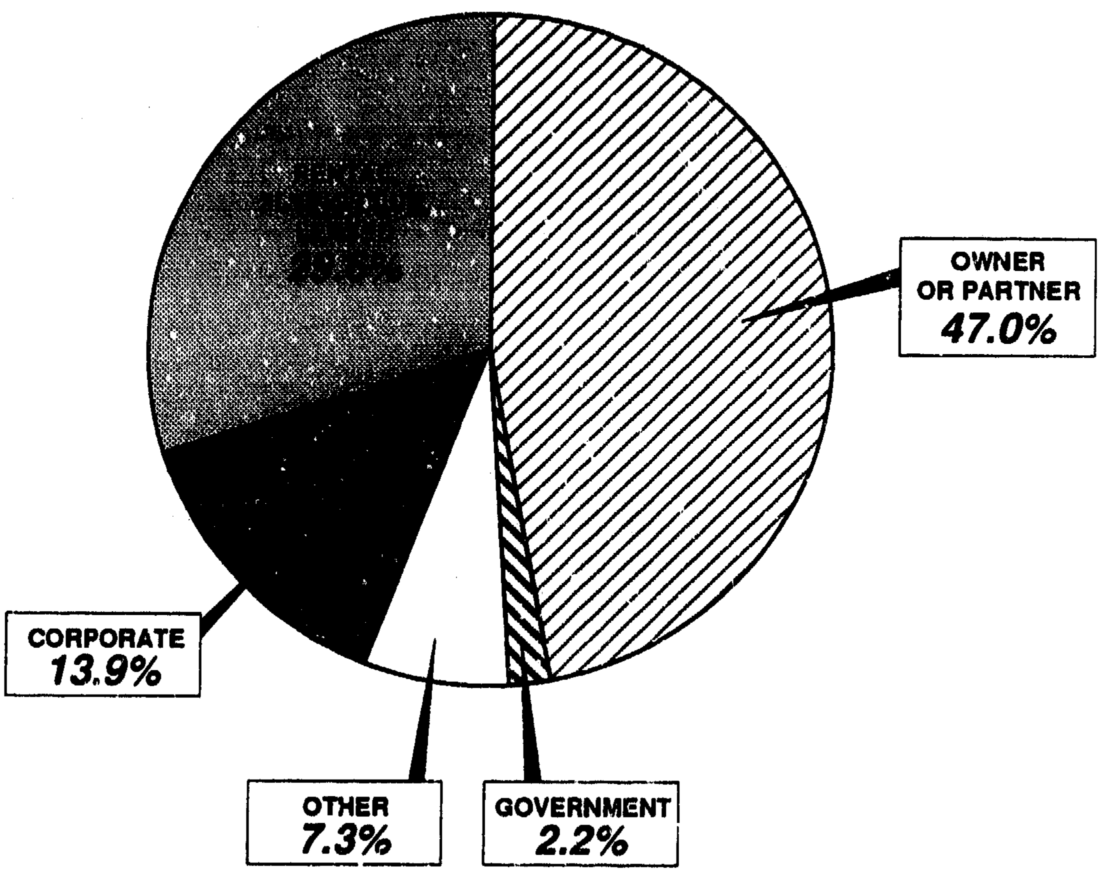
| PILOT AGE | SOURCE OF AIRCRAFT | | | | | |
|---|---|---|---|---|---|---|
| | OWNER OR PARTNER | RENTAL, FLYING CLUB, LEASED | CORP | GOV'T | OTHER | TOTAL |
| UNDER 16[12] | 0.0 | 90.9 | 0.0 | 0.0 | 9.1 | 100.0 |
| 16-19 | 18.2 | 63.7 | 5.4 | 0.0 | 12.7 | 100.0 |
| 20-24 | 18.3 | 61.9 | 7.8 | 1.0 | 11.0 | 100.0 |
| 25-29 | 22.3 | 50.1 | 12.7 | 2.0 | 12.9 | 100.0 |
| 30-34 | 35.4 | 38.6 | 14.2 | 2.1 | 9.7 | 100.0 |
| 35-39 | 44.8 | 31.8 | 12.1 | 2.7 | 8.6 | 100.0 |
| 40-44 | 51.7 | 21.2 | 17.9 | 2.6 | 6.6 | 100.0 |
| 45-49 | 54.0 | 17.3 | 20.0 | 4.2 | 4.5 | 100.0 |
| 50-54 | 58.7 | 18.2 | 17.2 | 2.0 | 3.9 | 100.0 |
| 55-59 | 71.6 | 12.3 | 10.5 | 2.0 | 3.6 | 100.0 |
| 60 AND OVER | 71.4 | 14.4 | 10.2 | 1.0 | 3.0 | 100.0 |
| ALL PILOTS[13] | 47.0 | 29.6 | 13.9 | 2.2 | 7.3 | 100.0 |

Pilots over age 35 were more likely to own an airplane than to obtain it from another source. In contrast, the majority of pilots up to age 34 obtained their aircraft from a lease, rental, or flying club. These figures were very similar in both the 1984 and 1981 surveys. In 1984, 45.7 percent of all active pilots owned their own aircraft. This figure increased slightly to 47.0 percent in 1990. In 1984, 32.0 percent of all active pilots flew rental, flying club or leased aircraft. This figure decreased slightly to 29.6 percent in 1990. Figure 2.3 on the following page shows the overall percentage distribution of source of aircraft.

[12] Extremely low representation in survey sample.

[13] All pilots' percentages are slightly different from Table 2.8 due to estimation procedures.

## Figure 2.3
# PERCENTAGE DISTRIBUTION OF SOURCE OF AIRCRAFT




***SOURCE: Table 2.12***

Data on the average lifetime hours flown by pilots as of 1990 by pilot certificate are presented in Table 2.13. Pilots with ATP certificates averaged the most lifetime hours flown, 8,751.0 hours. This is more than twice the number of hours of the next closest pilot certificate type, commercial.

**TABLE 2.13 AVERAGE LIFETIME HOURS FLOWN AS OF 1990 BY PILOT CERTIFICATE**

| STUDENT | PRIVATE | COMMERCIAL | ATP | FOREIGN |
|---|---|---|---|---|
| 59.3 | 992.8 | 3,660.3 | 8,751.0 | 2,810.2 |

The average number of hours flown in 1989 by type of pilot certificate are presented in Table 2.14.

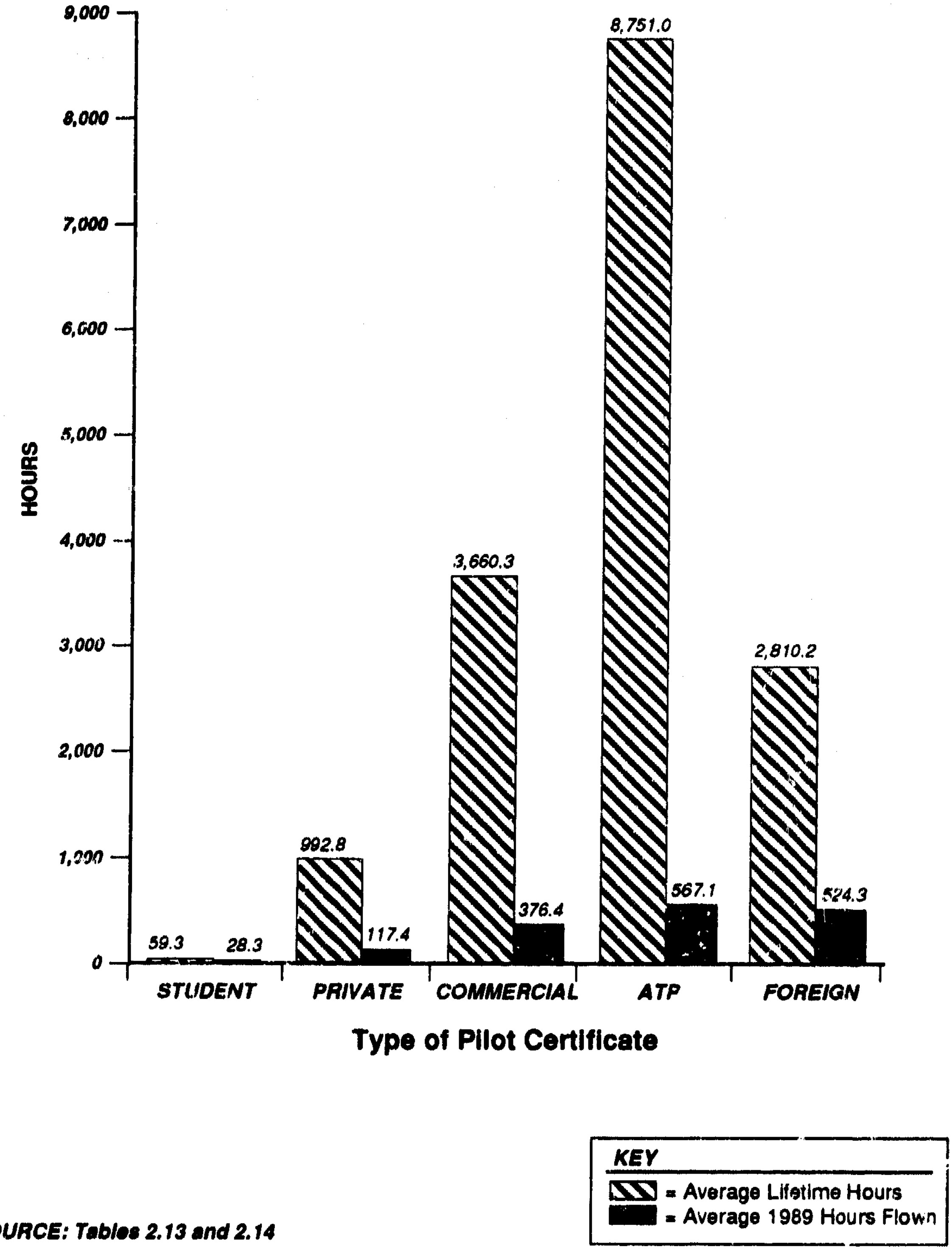
**TABLE 2.14 AVERAGE HOURS FLOWN IN 1989 BY PILOT CERTIFICATE**

| STUDENT | PRIVATE | COMMERCIAL | ATP | FOREIGN |
|---|---|---|---|---|
| 28.3 | 117.4 | 376.4 | 567.1 | 524.3 |

The ATP pilot certificate averaged the greatest number of hours flown in 1989, 567.1 hours. Foreign and commercial pilot certificates followed with 524.3 and 376.4 hours, respectively. Private pilots averaged 117.4 hours, and student pilots averaged only 28.3 hours in 1989. Figure 2.4 on the following page presents the average lifetime hours flown as of 1990 and the average number of hours flown in 1989 by type of pilot certificate.

Figure 2.4

**1990 AVERAGE LIFETIME HOURS FLOWN AND AVERAGE 1989 HOURS FLOWN BY TYPE OF PILOT CERTIFICATE**




*SOURCE: Tables 2.13 and 2.14*

The average hours flown in 1989 by pilot age are presented in Table 2.15, below, and graphically are presented in Figure 2.5 on the following page.

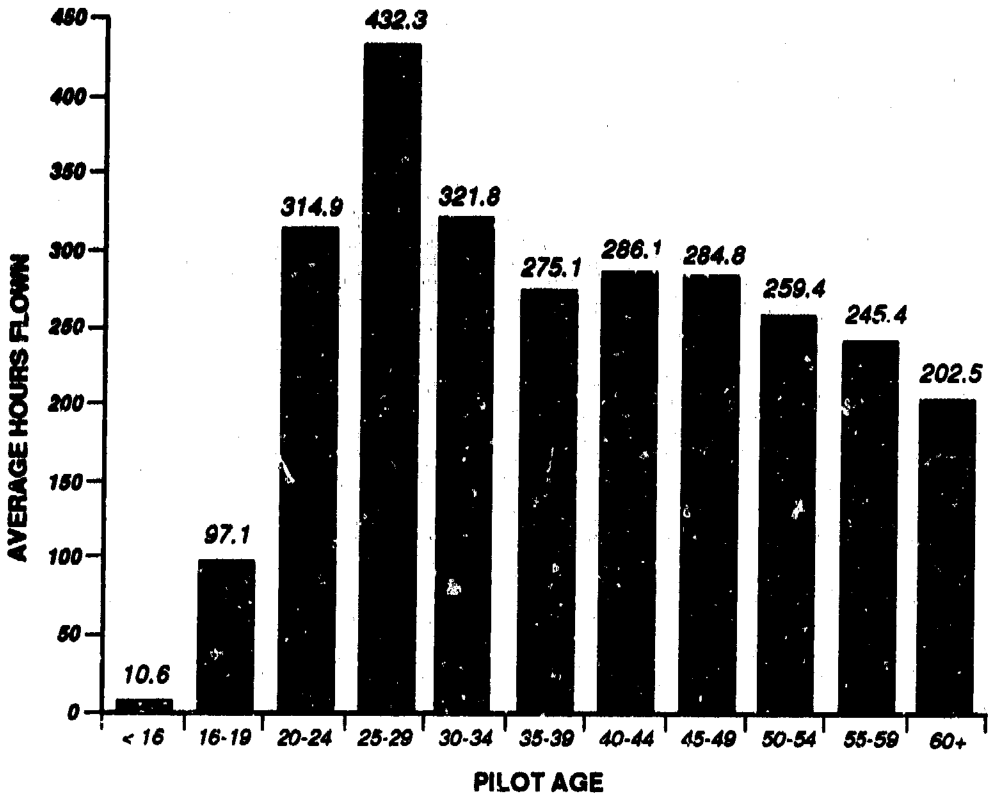
**TABLE 2.15 AVERAGE HOURS FLOWN IN 1989 BY PILOT AGE**

| PILOT AGE | AVERAGE HOURS FLOWN |
|---|---|
| UNDER 16 | 10.6 |
| 16-19 | 97.1 |
| 20-24 | 314.9 |
| 25-29 | 432.3 |
| 30-34 | 321.8 |
| 35-39 | 275.1 |
| 40-44 | 286.1 |
| 45-49 | 284.8 |
| 50-54 | 259.4 |
| 55-59 | 245.4 |
| 60 AND OVER | 202.5 |

Those pilots in the 25-29 age bracket averaged the greatest number of hours flown in 1989, 432.3 hours. The fewest average hours flown in 1989 were flown by pilots in the under age 16 category (10.6 hours) and the 16-19 age bracket (97.1 hours).

**Figure 2.5**

## AVERAGE HOURS FLOWN IN 1989 BY PILOT AGE




***SOURCE: Table 2.15***

It is also interesting to note the relationship between pilot age and type of aircraft used for flying. Table 2.16, below, presents the percentage age distributions of pilots by aircraft type. For most aircraft types, the highest percentages of pilots flying aircraft fall between the ages of 25-49. In general, the more sophisticated the aircraft, the older the pilot up until the 50-54 age bracket. The percentage distributions for all types of aircraft, with the exception of the glider aircraft category, decline in the 55-59 age bracket. However, it should be noted that gliders had an extremely low representation in the survey.

**TABLE 2.16 PERCENTAGE DISTRIBUTION OF AIRCRAFT TYPE BY PILOT AGE**

| PILOT AGE | AIRCRAFT TYPE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SINGLE ENGINE PISTON 1-3 | SINGLE ENGINE PISTON 4 AND OVER | MULTI ENGINE PISTON | ROTORCRAFT PISTON | ROTORCRAFT TURBINE | TURBOPROP | TURBOJET | GLIDER |
| UNDER 16 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 16-19 | 2.9 | 1.2 | 0.1 | 0.9 | 0.0 | 0.8 | 0.3 | 0.0 |
| 20-24 | 12.0 | 9.1 | 7.1 | 16.2 | 0.0 | 4.5 | 2.7 | 0.0 |
| 25-29 | 15.3 | 13.6 | 14.1 | 12.5 | 2.0 | 21.0 | 9.0 | 0.0 |
| 30-34 | 11.8 | 10.7 | 15.6 | 20.3 | 8.4 | 20.0 | 8.8 | 21.7 |
| 35-39 | 12.9 | 11.6 | 10.2 | 19.0 | 22.9 | 13.4 | 13.0 | 0.0 |
| 40-44 | 11.5 | 14.4 | 13.8 | 20.0 | 31.1 | 16.0 | 26.8 | 0.0 |
| 45-49 | 9.9 | 11.5 | 13.9 | 5.6 | 27.2 | 11.1 | 19.4 | 0.0 |
| 50-54 | 6.2 | 9.3 | 11.8 | 3.9 | 7.5 | 6.2 | 14.2 | 31.7 |
| 55-59 | 6.0 | 8.7 | 6.9 | 1.6 | 0.4 | 3.7 | 3.1 | 46.6 |
| 60 AND OVER | 11.0 | 9.9 | 6.5 | 0.0 | 0.5 | 3.3 | 2.7 | 0.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Table 2.17 below presents the cross tabulation between aircraft type and pilot certificate.

**TABLE 2.17 PERCENTAGE DISTRIBUTION OF AIRCRAFT TYPE BY PILOT CERTIFICATE**

| AIRCRAFT TYPE | PILOT CERTIFICATE | | | | |
|---|---|---|---|---|---|
| | STUDENT | PRIVATE | COMMERCIAL | ATP | FOREIGN |
| SINGLE ENGINE PISTON 1-3 SEATS | 64.1 | 26.1 | 22.9 | 6.4 | 11.8 |
| SINGLE ENGINE PISTON 4+ SEATS | 30.9 | 67.3 | 47.2 | 20.6 | 11.7 |
| MULTI-ENGINE PISTON | 0.0 | 5.7 | 18.5 | 20.0 | 23.6 |
| ROTORCRAFT PISTON | 4.7 | 0.5 | 1.7 | 0.2 | 0.0 |
| ROTORCRAFT TURBINE | 0.2 | 0.0 | 2.5 | 3.6 | 5.8 |
| TURBOPROP | 0.1 | 0.4 | 6.2 | 30.9 | 41.2 |
| TURBOJET | 0.0 | 0.0 | 0.9 | 18.3 | 5.9 |
| GLIDER | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

The statistics show that 95.1 percent of student pilots learned to fly fixed-wing aircraft while only 4.9 percent learned to fly rotorcraft. Not a single student pilot learned to fly a glider. Private pilots most often fly single engine piston aircraft, and commercial pilots most often fly both single and multi-engine piston aircraft. As one might expect, the most popular aircraft type in the ATP certificate category is the turboprop, with 30.9 percent. However, turbojet aircraft are most often flown by pilots with ATP certification. Foreign pilots most often fly turboprops, with 41.2 percent, followed by multi-engine piston aircraft with 23.6 percent.

# CHAPTER III

## FLIGHT PROFILES

The second major objective of the 1990 FAA/CAP survey was to develop flight profiles. Several flight characteristics such as time, speed, altitude, distance, landings per flight, type of flight, purpose of trip, and load factor were analyzed along with Mode C capabilities.

A comparison of the distribution of surveyed aircraft over the past three survey periods (1981, 1984 and 1990) with the distribution of registered active aircraft for 1981, 1984, and 1990 by type of aircraft is presented in Table 3.1. The two sets of distributions have remained fairly constant over time. The over-representation of turboprops in the survey is due to the inclusion of commuter air carriers which primarily operate turboprops. The underrepresentation of rotorcraft may be a function of the sampled airports, which are primarily general aviation airports.

TABLE 3.1 PERCENTAGE DISTRIBUTION OF SURVEYED AIRCRAFT AND REGISTERED AIRCRAFT IN THE GENERAL AVIATION ACTIVE AIRCRAFT FLEET BY AIRCRAFT TYPE

| AIRCRAFT TYPE | PERCENTAGE DISTRIBUTION | | | | | |
|---|---|---|---|---|---|---|
| | SURVEYED AIRCRAFT | | | REGISTERED ACTIVE AIRCRAFT[14] | | |
| | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 |
| SINGLE ENGINE PISTON | 82.1 | 78.5 | 75.4 | 78.8 | 78.0 | 77.6 |
| MULTI-ENGINE PISTON | 10.6 | 11.7 | 11.3 | 11.9 | 11.7 | 10.6 |
| ROTORCRAFT | 2.0 | 2.0 | 2.6 | 3.3 | 3.1 | 3.4 |
| TURBOPROP | 3.6 | 4.3 | 7.1 | 2.2 | 2.6 | 2.9 |
| TURBOJET | 1.0 | 2.2 | 3.2 | 1.5 | 1.8 | 2.0 |
| OTHER AIRCRAFT | 0.7 | 1.3 | 0.4 | 2.3 | 2.8 | 3.5 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

In analyzing average local flight characteristics by aircraft type, the following variables were considered: landings per flight, flight time, flight speed,

[14] "1989 General Aviation Activity and Avionics Survey," U.S. Department of Transportation, Federal Aviation Administration, Washington, D.C., 1990, p. 1-11 (December 31, 1989 = January 1, 1990).

number of seats available, number of seats occupied and load factor (the percentage of seats occupied out of those available). Table 3.2, below, presents the average local flight characteristics by aircraft type in 1990.

TABLE 3.2 AVERAGE LOCAL FLIGHT CHARACTERISTICS BY AIRCRAFT TYPE

| AIRCRAFT TYPE | AVERAGE LOCAL FLIGHT CHARACTERISTICS | | | | | |
|---|---|---|---|---|---|---|
| | LANDINGS PER FLIGHT | FLIGHT TIME (MIN) | FLIGHT SPEED (KNOTS) | SEATS AVAILABLE | SEATS OCCUPIED | LOAD FACTOR |
| SINGLE-ENGINE PISTON (1-3 SEATS) | 3.1 | 73.6 | 92.1 | 1.9 | 1.6 | 84.2 |
| SINGLE-ENGINE PISTON (4+ SEATS) | 2.6 | 71.5 | 109.7 | 4.1 | 2.0 | 48.8 |
| MULTI-ENGINE PISTON | 2.6 | 92.8 | 148.8 | 5.4 | 2.5 | 46.3 |
| ROTORCRAFT PISTON | 7.3 | 93.2 | 66.0 | 2.0 | 1.7 | 85.0 |
| ROTORCRAFT TURBINE | 3.4 | 82.1 | 94.4 | 5.5 | 3.1 | 56.4 |
| TURBOPROP | 1.5 | 58.2 | 165.9 | 9.1 | 4.3 | 47.3 |
| TURBOJET | 2.1 | 32.4 | 207.2 | 9.0 | 3.0 | 33.3 |
| GLIDER | 2.7 | 45.3 | 56.2 | 2.0 | 2.0 | 100.0 |

Table 3.3, on the following page, presents the same 1990 survey information for the first two characteristics in Table 3.2, as well as load factor, together with corresponding data from the 1981 and 1984 surveys.

**TABLE 3.3 SELECTED AVERAGE LOCAL FLIGHT CHARACTERISTICS FOR SURVEY YEARS 1981, 1984 AND 1990 BY AIRCRAFT TYPE**

| AIRCRAFT TYPE | AVERAGE LOCAL FLIGHT CHARACTERISTICS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LANDINGS PER FLIGHT | | | FLIGHT TIME (MINUTES) | | | LOAD FACTOR | | |
| | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 |
| SINGLE-ENGINE PISTON (1-3 SEATS) | 2.6 | 3.5 | 3.1 | 54.8 | 57.0 | 73.6 | 82.8 | 87.3 | 84.2 |
| SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 2.2 | 2.5 | 2.6 | 54.5 | 50.3 | 71.5 | 53.4 | 48.5 | 48.8 |
| MULTI-ENGINE PISTON | 2.1 | 2.8 | 2.6 | 55.9 | 42.2 | 92.8 | 47.2 | 43.6 | 46.3 |
| ROTORCRAFT PISTON | 3.1 | 4.3 | 7.3 | 80.7 | 53.3 | 93.2 | 81.7 | 57.2 | 85.0 |
| ROTORCRAFT TURBINE | 1.9 | 3.2 | 3.4 | 73.9 | 80.4 | 82.1 | 60.2 | 45.5 | 56.4 |
| TURBOPROP | 1.1 | 1.0 | 1.5 | 35.5 | 12.9 | 58.2 | 29.8 | 31.0 | 47.3 |
| TURBOJET | 1.0 | 2.8 | 2.1 | 6.0 | 60.6 | 32.4 | 10.0 | 50.0 | 33.3 |
| GLIDER | 1.4 | 2.2 | 2.7 | 55.7 | 97.7 | 45.3 | 100.0 | 95.2 | 100.0 |

Local flight characteristics remained fairly stable over time for all aircraft types with a few notable exceptions. Both rotorcraft piston and turboprop aircraft experienced increases in the number of landings per flight. The turboprop increase is attributable to increased aerial application flying (with proportionately greater flight time) in the sample. In most of the aircraft types, close to three takeoffs and three landings per flight were performed over the course of an hour.

Flight times also increased across all aircraft types, except for turbojets and gliders. The load factor for rotorcraft piston increased from 1984's figure of 57.2 percent to 1990's figure of 85.0 percent. Load factors for the other aircraft types increased or decreased on a more moderate scale. These fluctations could be attributable to the discrepancy of sampling, as well as survey procedures. In most cases, there were an average of two persons aboard a piston engine aircraft: most likely a pilot-in-command and a flight

instructor, for much local flying is instructional. On turbine engine aircraft, there were an average of three persons: a pilot-in-command, a flight instructor and a co-pilot.

In analyzing average cross-country flights, somewhat different variables were considered than those examined in local flights. Cross-country characteristics examined were last leg distance, last leg time, total trip distance, seats available, seats occupied, and load factor. Table 3.4 presents these cross-country characteristics for 1990. Table 3.5 arrays the first three cross-country characteristics and load factor in Table 3.4 with the corresponding data from the 1984 and 1981 surveys.

TABLE 3.4 AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS BY AIRCRAFT TYPE

| AIRCRAFT TYPE | AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS | | | | | |
|---|---|---|---|---|---|---|
| | LAST LEG DIST (NM) | LAST LEG TIME (MIN) | TOTAL TRIP DIST (NM) | SEATS AVAILABLE | SEATS OCCUPIED | LOAD FACTOR |
| SINGLE-ENGINE PISTON (1-3 SEATS) | 123.9 | 77.9 | 202.2 | 1.9 | 1.4 | 73.7 |
| SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 172.0 | 83.1 | 249.4 | 4.5 | 2.4 | 53.3 |
| MULTI-ENGINE PISTON | 215.5 | 83.5 | 341.6 | 5.8 | 3.0 | 51.7 |
| ROTORCRAFT PISTON | 76.7 | 46.5 | 185.2 | 2.0 | 1.7 | 85.0 |
| ROTORCRAFT TURBINE | 116.7 | 70.5 | 191.7 | 7.6 | 4.0 | 52.6 |
| TURBOPROP | 212.8 | 64.8 | 288.2 | 14.7 | 7.9 | 53.7 |
| TURBOJET | 607.8 | 78.5 | 782.5 | 9.9 | 4.9 | 49.5 |

In 1990, the longest last leg distance was incurred by turbojets, 608 nautical miles. Turbojets also averaged the greatest total trip distance, 783 nautical miles. No cross-country flight characteristics were estimated for gliders because only one cross-country glider pilot was interviewed.

In general, the more sophisticated the aircraft, the greater the total trip distance recorded. Total trip distance increased from 1984's estimates for every aircraft type. Last leg times for five of the eight aircraft types also increased from 1984's figures. Most aircraft load factors were near 50 percent, except for single engine piston (1-3 seats), with 74 percent and rotorcraft piston, with 85 percent. Although the last leg distance for most aircraft in the 1990 survey increases, most of these changes were relatively small.

TABLE 3.5 SELECTED AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS BY AIRCRAFT TYPE FOR SURVEY YEARS 1981, 1984 AND 1990

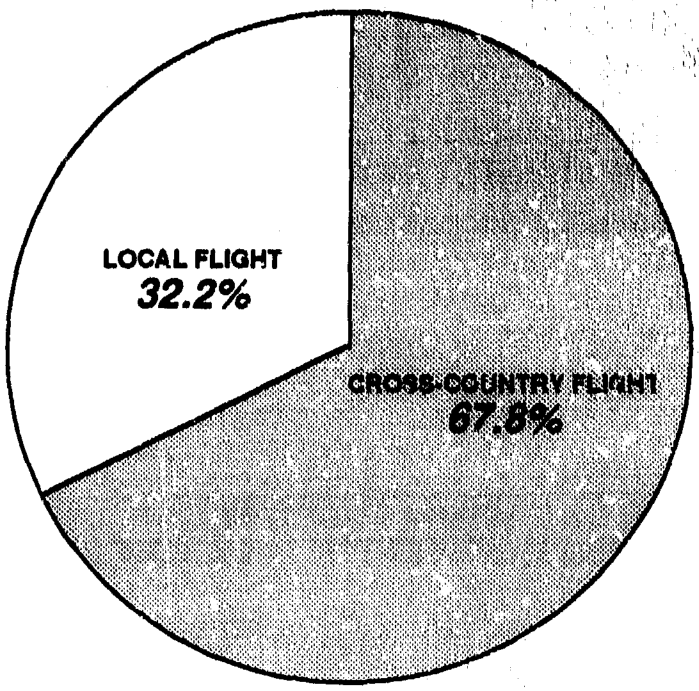
| AIRCRAFT TYPE | AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LAST LEG DISTANCE (NAUTICAL MILES) | | | LAST LEG TIME (MINUTES) | | | TOTAL TRIP DISTANCE (NAUTICAL MILES) | | | LOAD FACTOR | | |
| | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 |
| SINGLE-ENGINE PISTON (1-3 SEATS) | 104 | 124 | 124 | 91 | 69 | 78 | 166.5 | 191.6 | 202.2 | 75.9 | 76.0 | 73.7 |
| SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 170 | 157 | 172 | 91 | 82 | 83 | 253.7 | 232.2 | 249.4 | 56.3 | 51.5 | 53.3 |
| MULTI-ENGINE PISTON | 205 | 208 | 216 | 93 | 72 | 84 | 328.2 | 329.8 | 341.6 | 55.7 | 50.9 | 51.7 |
| ROTORCRAFT PISTON | 60 | 63 | 77 | 37 | 79 | 47 | 561.6 | 155.4 | 185.2 | 93.3 | 64.3 | 85.0 |
| ROTORCRAFT TURBINE | 86 | 121 | 117 | 77 | 67 | 71 | 176.7 | 175.5 | 191.7 | 45.2 | 50.4 | 52.6 |
| TURBOPROP | 215 | 261 | 213 | 53 | 71 | 65 | 280.1 | 373.4 | 288.2 | 47.0 | 52.4 | 53.7 |
| TURBOJET | 498 | 520 | 608 | 82 | 84 | 79 | 697.6 | 630.6 | 782.5 | 62.2 | 51.1 | 49.5 |

The percentage of flights that were local and cross-country are presented by aircraft type in Table 3.6. Figure 3.1 compares the percentage distribution of local and cross-country flights.

TABLE 3.6 PERCENTAGE DISTRIBUTION OF TYPE OF FLIGHT BY AIRCRAFT TYPE

| AIRCRAFT TYPE | TYPE OF FLIGHT | |
|---|---|---|
| | LOCAL | CROSS-COUNTRY |
| SINGLE ENGINE PISTON (1-3 SEATS) | 64.0 | 36.0 |
| SINGLE ENGINE PISTON (4 SEATS AND OVER) | 37.0 | 63.0 |
| MULTI-ENGINE PISTON | 16.1 | 83.9 |
| ROTORCRAFT PISTON | 82.1 | 17.9 |
| ROTORCRAFT TURBINE | 39.4 | 60.6 |
| TURBOPROP | 3.7 | 96.3 |
| TURBOJET | 5.0 | 95.0 |
| GLIDER | 84.5 | 15.5 |
| TOTAL | 32.2 | 67.8 |

Figure 3.1
## TYPE OF FLIGHT
## (PERCENTAGE DISTRIBUTION)




***SOURCE: Table 3.6***

More than two-thirds (67.8 percent) of general aviation operations surveyed were cross-country flights. Different types of aircraft are used primarily for cross-country as opposed to local flights. Over 83 percent of the flights made in multi-engine piston, turboprop and turbojet aircraft are cross-country. Local flights were primarily conducted in gliders, rotorcraft piston, and single engine piston rotorcraft.

Since 1978, the percentage of cross-country flights has steadily increased, from 50.5 percent in 1978 to this year's high of 67.8 percent (see Figure 3.2 on page 3-9), and the percentage of local flights has decreased. Since most training flights for student pilots are local, the decrease in local flight time could be attributable to the decrease in the student pilot population. The number of student pilots has steadily decreased from a high of 180,000 student pilots in 1981, to 150,000 student pilots in 1984, and a low of 126,000 student pilots in 1990.

Table 3.7 displays, by type of airport, the distribution of surveyed airports and of airports open to the public. Based on FAA's estimate that general aviation traffic at towered airports may account for more than 40 percent of total general aviation traffic, relatively more towered airports were included in this year's survey in order to provide a more adequate base of estimates.[15]

**TABLE 3.7 PERCENTAGE DISTRIBUTION OF SURVEYED AIRPORTS AND AIRPORT POPULATION BY TYPE OF AIRPORT**

| TYPE OF AIRPORT | AIRPORTS OPEN TO PUBLIC[16] | SURVEYED AIRPORTS[17] |
|---|---|---|
| TOWERED | 9.0 | 24.3 |
| NON-TOWERED | 91.0 | 75.7 |
| PAVED, LIGHTED RUNWAYS | 46.5 | 36.7 |
| PAVED, UNLIGHTED RUNWAYS | 17.4 | 16.9 |
| UNPAVED RUNWAYS | 27.1 | 22.1 |
| TOTAL | 100.0 | 100.0 |

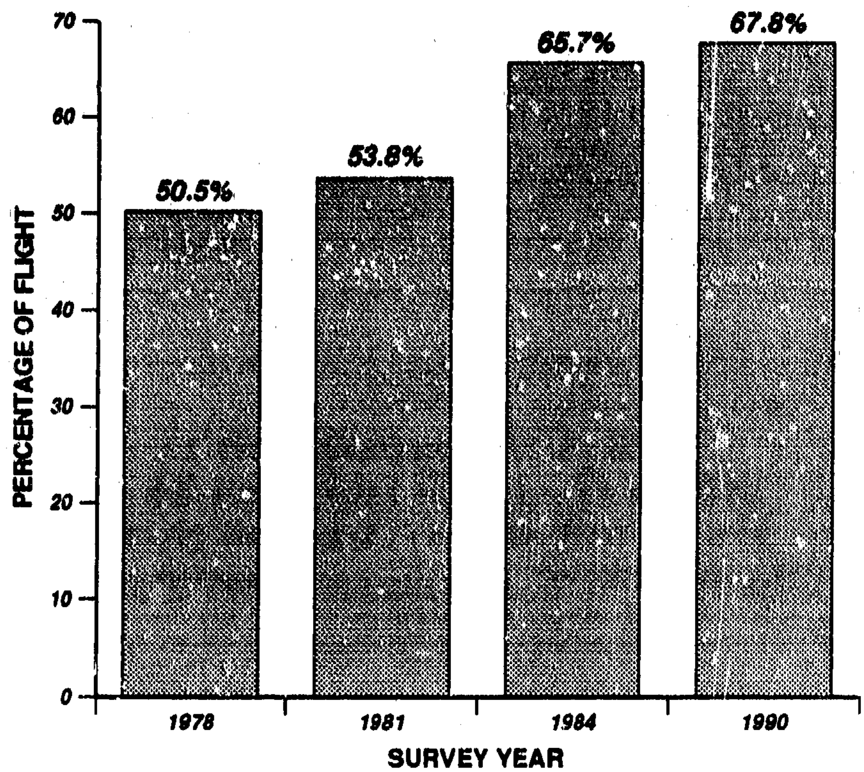
[15]FAA Air Traffic Activity, FY 1989.

[16]According to the Airport Master File which is maintained by FAA's National Flight Data Center.

[17]Represents airports at which traffic counts were conducted.

**Figure 3.2**

## CROSS-COUNTRY FLIGHT AS PERCENT OF ALL FLIGHTS FOR SURVEY YEARS SINCE 1977



The following four types of airports were sampled in the survey:

1) Towered;
2) Non-Towered, paved and lighted (with at least one paved runway);
3) Non-Towered, paved and unlighted (with at least one paved runway), and
4) Non-towered, unpaved.

Traffic activity between types of airports was also examined in the survey. Table 3.8 shows the percentage distribution of cross-country flights grouped according to originating and destination airport type. The greatest percentage of cross-country flights originated from towered airports and ended at other towered airports (31.5 percent). The least percentage of flights originated from and were destined for non-towered airports with unpaved runways.

**TABLE 3.8 PERCENTAGE DISTRIBUTION OF CROSS-COUNTRY FLIGHT BY ORIGINATING AIRPORT TYPE AND DESTINATION AIRPORT TYPE**

| ORIGINATING AIRPORT TYPE | DESTINATION AIRPORT TYPE | | |
|---|---|---|---|
| | TOWERED | NON-TOWERED, PAVED RUNWAYS | NON-TOWERED, UNPAVED RUNWAYS |
| TOWERED | 31.5 | 15.9 | 1.3 |
| NON-TOWERED, PAVED RUNWAYS | 27.9 | 18.3 | 1.6 |
| NON-TOWERED, UNPAVED RUNWAYS | 1.2 | 1.8 | 0.5 |

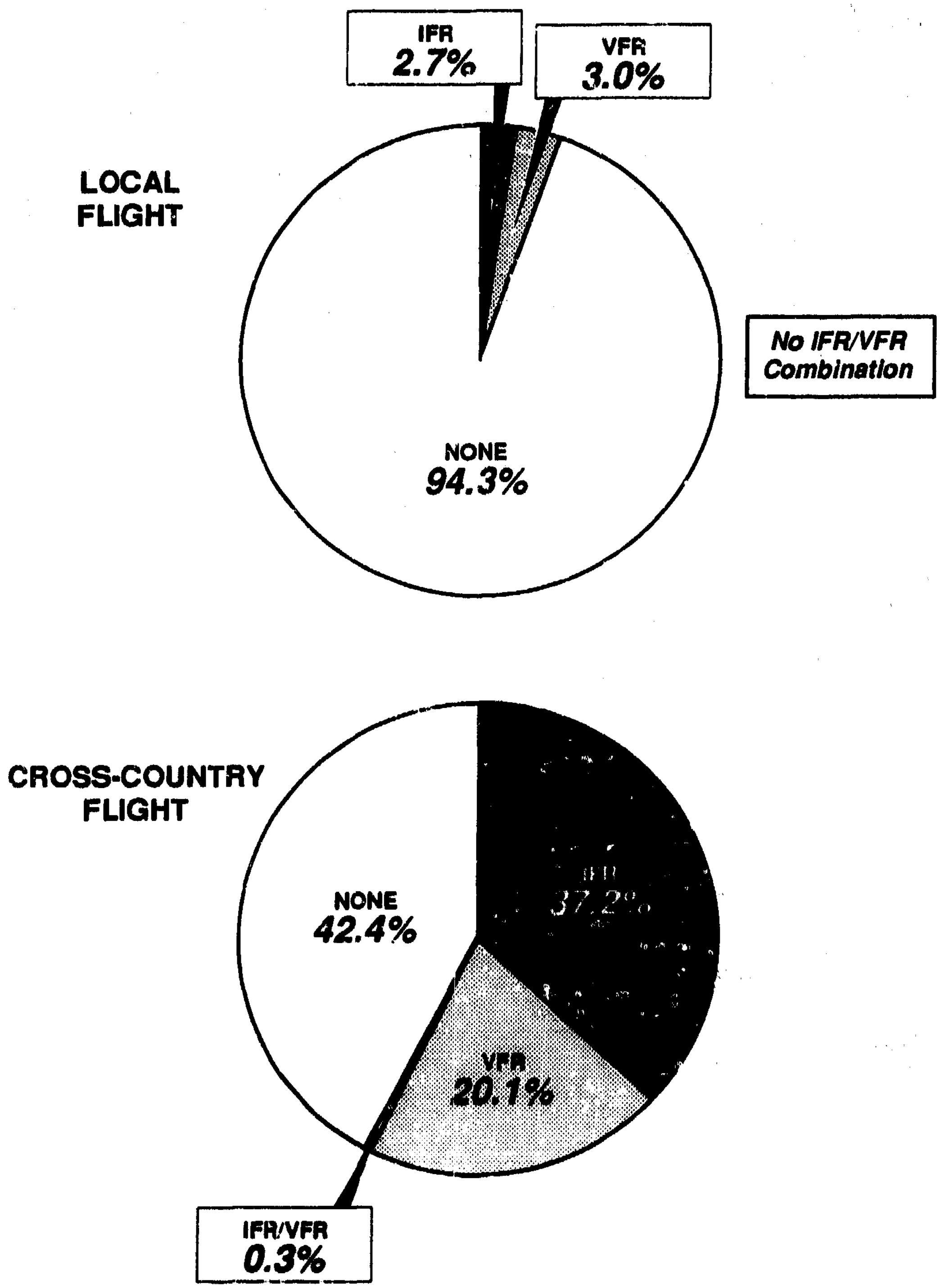
The following series of tables considers the relationships between the purpose of the flight and: utilization of flight plan (Table 3.9); local flight characteristics (Table 3.10); cross-country characteristics (Table 3.11); aircraft type (Table 3.12); and source of aircraft (Table 3.13).

The purpose of flight was classified in nine categories: personal, business, executive/corporate, commuter air carrier, air taxi, instructional, aerial application, industrial or other. These use categories are defined in the glossary in Appendix D of this report.

From data in Table 3.9 and the upper chart in Figure 3.3 on page 3-11, it is seen that more than 94.3 percent of all local flights did not file any flight plan prior to takeoff, regardless of the purpose of the flight. As discussed in Chapter II, the purpose of a flight plan is to inform the FAA about the destination, direction and route of a flight so that available air space can be monitored and, in the event of an overdue aircraft, search procedures can be initiated. The only notable exception to filing a flight plan in local flights

**Figure 3.3**

## UTILIZATION OF FLIGHT PLAN BY TYPE OF FLIGHT




***SOURCE: Table 3.9***

is air taxi, which filed a local flight plan 20 percent of the time (12.8 percent IFR and 7.1 percent VFR). Since local flight by definition includes only those flights within a 20 mile radius of an airport, there generally is no need to file a flight plan in local flight. Those pilots who filed local flight plans most likely filed one for training purposes.

TABLE 3.9 PERCENTAGE UTILIZATION OF FLIGHT PLAN BY TYPE AND PURPOSE OF FLIGHT

| LOCAL FLIGHT PLAN | | | | PURPOSE OF FLIGHT | CROSS-COUNTRY FLIGHT PLAN | | | |
|---|---|---|---|---|---|---|---|---|
| NONE | IFR | VFR | IFR/VFR | | NONE | IFR | VFR | IFR/VFR |
| 96.9 | 0.3 | 2.8 | 0.0 | PERSONAL | 60.2 | 19.9 | 19.6 | 0.3 |
| 100.0 | 0.0 | 0.0 | 0.0 | BUSINESS | 36.9 | 49.8 | 12.9 | 0.4 |
| 95.9 | 1.4 | 2.6 | 0.1 | EXECUTIVE/CORPORATE | 11.6 | 84.5 | 3.9 | 0.0 |
| 93.4 | 3.7 | 2.9 | 0.0 | COMMUTER AIR CARRIER | 6.1 | 78.7 | 13.7 | 1.5 |
| 80.1 | 12.8 | 7.1 | 0.0 | AIR TAXI | 11.3 | 65.5 | 22.7 | 0.5 |
| 100.0 | 0.0 | 0.0 | 0.0 | INSTRUCTIONAL | 30.1 | 17.6 | 52.3 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | AERIAL APPLICATION | 100.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | INDUSTRIAL | 65.0 | 7.5 | 27.5 | 0.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | OTHER | 48.7 | 21.6 | 28.4 | 1.3 |
| 94.3 | 2.7 | 3.0 | 0.0 | ALL FLIGHTS | 42.4 | 37.2 | 20.1 | 0.3 |

A flight plan is filed for safety reasons and is most often filed in cross-country flights. In more than 57 percent of cross-country flights, either an IFR or VFR flight plan was filed in 1990, as compared to only 55 percent in the 1984 survey. In terms of purpose of flight, 93.9 percent of commuter air carrier flights, 88.7 percent of air taxi, and 88.4 percent of executive/corporate flights filed a cross-country flight plan in 1990. However, only 39.8 percent of personal flights filed a cross-country flight plan.

In Table 3.10 on the following page, the most landings per local flight were associated with aerial application. Local aerial application flights also had the longest flight time, 143.3 minutes. In contrast, local executive/corporate flights had the fastest flight speed, 163.1 knots, as well as the shortest local flight time, 53.7 minutes.

TABLE 3.10 AVERAGE LOCAL FLIGHT CHARACTERISTICS BY PURPOSE OF FLIGHT

| PURPOSE OF FLIGHT | AVERAGE LOCAL FLIGHT CHARACTERISTICS | | |
|---|---|---|---|
| | LANDINGS PER FLIGHT | FLIGHT TIME (MINUTES) | FLIGHT SPEED (KNOTS) |
| PERSONAL | 2.6 | 64.0 | 105.0 |
| BUSINESS | 1.9 | 56.1 | 113.8 |
| EXECUTIVE/CORPORATE | 2.3 | 53.7 | 163.1 |
| COMMUTER | 4.6 | 101.1 | 133.3 |
| AIR TAXI | 2.4 | 56.3 | 119.2 |
| INSTRUCTIONAL | 3.7 | 76.7 | 94.6 |
| AERIAL APPLICATION | 6.4 | 143.3 | 105.0 |
| INDUSTRIAL | 1.5 | 119.4 | 97.6 |
| OTHER | 2.6 | 78.6 | 113.3 |

Table 3.11 presents the average cross-country flight characteristics by purpose of flight. Cross-country executive/corporate and industrial flights flew the farthest, 430.2 and 427.7 nautical miles, respectively, and had the longest last leg distance.

TABLE 3.11 AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS BY PURPOSE OF FLIGHT

| PURPOSE OF FLIGHT | AVERAGE CROSS-COUNTRY FLIGHT CHARACTERISTICS | | |
|---|---|---|---|
| | LAST LEG DISTANCE | LAST LEG TIME (MINUTES) | TOTAL TRIP DISTANCE |
| PERSONAL | 176.1 | 95.9 | 258.4 |
| BUSINESS | 252.6 | 96.2 | 331.1 |
| EXECUTIVE/CORPORATE | 298.3 | 78.4 | 430.2 |
| COMMUTER | 130.9 | 50.1 | 178.8 |
| AIR TAXI | 193.8 | 69.5 | 303.3 |
| INSTRUCTIONAL | 89.9 | 92.3 | 144.8 |
| AERIAL APPLICATION | 102.5 | 66.0 | 297.5 |
| INDUSTRIAL | 368.7 | 130.1 | 427.7 |
| OTHER | 196.0 | 92.4 | 303.1 |

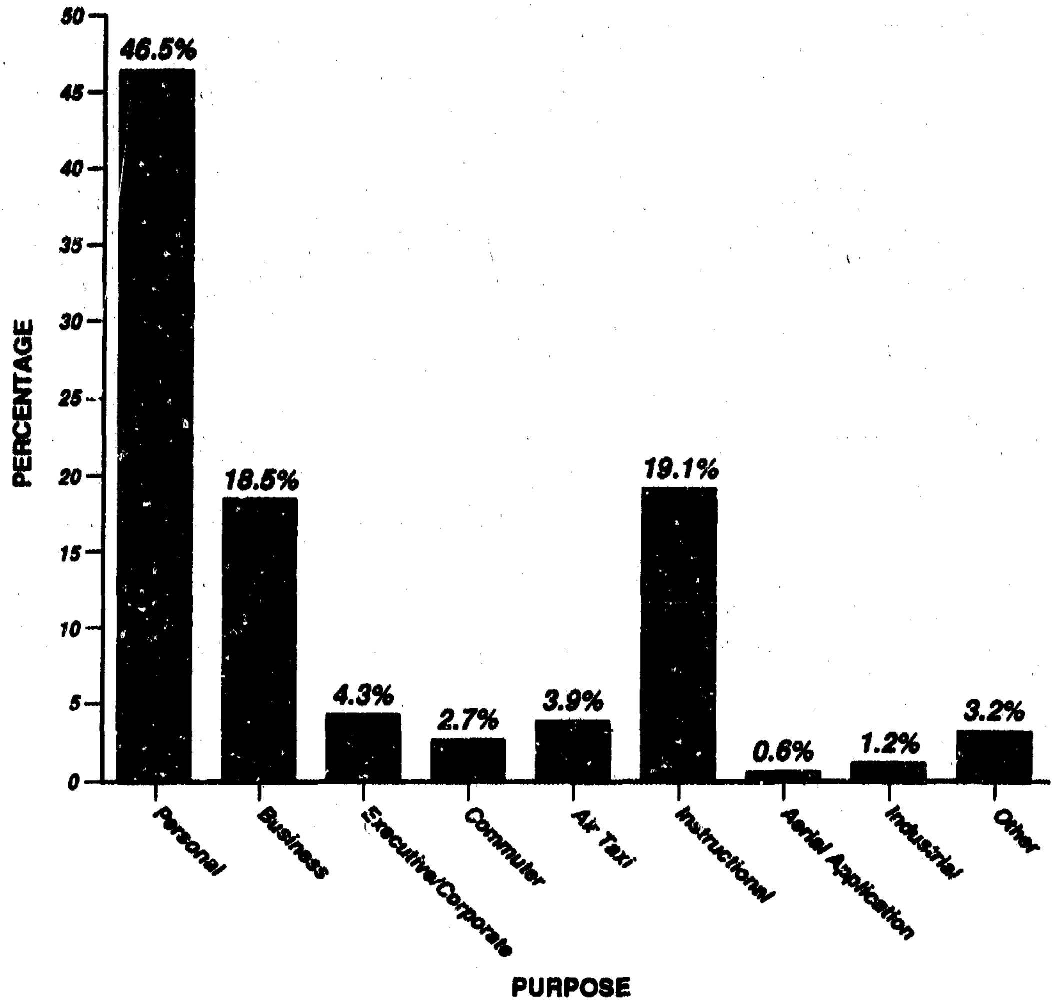
As shown in Table 3.12 and in Figure 3.4 on page 3-15, nearly half of all general aviation flights (46.5 percent) are personal. The next two most frequent uses are instruction (19.1 percent) and business (18.5 percent). Single engine piston and glider aircraft are most often flown for personal reasons, while turbojets, multi-engine piston, and rotorcraft turbine are most frequently flown for business purposes with 43.6 percent, 33.7 percent, and 33.4 percent, respectively. Rotorcraft piston are flown 57.1 percent of the time for instructional purposes, while turboprops are most often flown for business and commuter purposes, each with 28.1 percent.

TABLE 3.12 PERCENTAGE DISTRIBUTION OF FLIGHT PURPOSE BY AIRCRAFT TYPE

| PURPOSE OF FLIGHT | AIRCRAFT TYPE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | SINGLE ENGINE PISTON (1-3 SEATS) | SINGLE ENGINE PISTON (4 SEATS AND OVER) | MULTI-ENGINE PISTON | ROTORCRAFT PISTON | ROTORCRAFT TURBINE | TURBO-PROP | TURBO-JET | GLIDER | ALL AIRCRAFT TYPES |
| PERSONAL | 52.5 | 58.7 | 27.2 | 19.1 | 2.8 | 4.9 | 3.6 | 100.0 | 46.5 |
| BUSINESS | 6.6 | 18.0 | 33.7 | 11.2 | 33.4 | 28.1 | 43.6 | 0.0 | 18.5 |
| EXECUTIVE/ CORPORATE | 0.2 | 0.9 | 8.7 | 0.0 | 9.8 | 18.6 | 38.8 | 0.0 | 4.3 |
| COMMUTER | 0.4 | 0.3 | 3.1 | 1.5 | 1.3 | 28.1 | 1.2 | 0.0 | 2.7 |
| AIR TAXI | 0.4 | 1.3 | 13.6 | 3.1 | 13.9 | 14.2 | 8.2 | 0.0 | 3.9 |
| INSTRUC-TIONAL | 34.1 | 16.7 | 8.4 | 57.1 | 1.3 | 1.3 | 2.3 | 0.0 | 19.1 |
| AERIAL APPLICA-TION | 1.9 | 0.0 | 0.6 | 0.0 | 1.4 | 0.8 | 0.0 | 0.0 | 0.6 |
| INDUSTRIAL | 1.6 | 1.1 | 0.8 | 3.2 | 8.3 | 0.2 | 0.5 | 0.0 | 1.2 |
| OTHER | 2.2 | 3.0 | 3.9 | 4.8 | 27.8 | 3.8 | 1.8 | 0.0 | 3.2 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Figure 3.4

## PERCENTAGE DISTRIBUTION OF ALL FLIGHTS BY PURPOSE OF FLIGHT




SOURCE: Table 3.12

Table 3.13 shows the percentage distribution of purpose of flight by source of aircraft. Privately owned aircraft are primarily flown for personal use (69.6 percent), with rental/flying club/leased aircraft most often flown for instructional purposes (45.2 percent). Both corporate and government owned aircraft are primarily flown for business reasons.

**TABLE 3.13 PERCENTAGE DISTRIBUTION OF FLIGHT PURPOSE BY SOURCE OF AIRCRAFT**

| PURPOSE OF FLIGHT | SOURCE OF AIRCRAFT | | | | | |
|---|---|---|---|---|---|---|
| | OWNER/ PARTNER | RENTAL, FLYING CLUB, LEASED | CORP | GOV'T | OTHER | ALL SOURCES |
| PERSONAL | 69.6 | 38.5 | 9.5 | 6.0 | 15.6 | 46.7 |
| BUSINESS | 18.2 | 8.4 | 42.4 | 36.3 | 10.0 | 18.5 |
| EXECUTIVE/CORPORATE | 0.8 | 0.3 | 25.2 | 7.8 | 1.3 | 4.3 |
| COMMUTER | 0.1 | 1.4 | 3.1 | 2.5 | 23.9 | 2.6 |
| AIR TAXI | 0.9 | 3.9 | 6.8 | 1.7 | 16.7 | 3.8 |
| INSTRUCTIONAL | 6.9 | 45.2 | 4.9 | 11.2 | 20.3 | 18.9 |
| AERIAL APPLICATION | 0.6 | 0.2 | 0.9 | 2.6 | 1.6 | 0.6 |
| INDUSTRIAL | 0.7 | 0.4 | 2.5 | 13.8 | 1.3 | 1.3 |
| OTHER | 2.2 | 1.7 | 4.7 | 18.1 | 9.3 | 3.3 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Table 3.14, below, shows that of all general aviation aircraft, close to half, 46.9 percent, are privately owned by individuals. Nearly a third, 29.6 percent of all general aviation aircraft, are rented or leased. Corporate owned aircraft account for 14.1 percent, and government aircraft account for 2.3 percent of all general aviation aircraft.

**TABLE 3.14 PERCENTAGE DISTRIBUTION OF SOURCE OF AIRCRAFT BY AIRCRAFT TYPE**

| SOURCE OF AIRCRAFT | AIRCRAFT TYPE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | SINGLE ENGINE PISTON (1-3 SEATS) | SINGLE ENGINE PISTON (4 SEATS AND OVER) | MULTI-ENGINE PISTON | ROTORCRAFT PISTON | ROTORCRAFT TURBINE | TURBO-PROP | TURBO-JET | GLIDER | ALL AIRCRAFT TYPES |
| OWNER/ PARTNER | 43.1 | 60.6 | 40.5 | 20.7 | 0.0 | 8.7 | 9.0 | 25.0 | 46.9 |
| RENTAL, FLYING CLUB, LEASED | 48.7 | 27.3 | 17.7 | 31.7 | 12.4 | 7.3 | 4.2 | 75.0 | 29.6 |
| CORPORATE | 2.6 | 6.4 | 31.1 | 4.8 | 28.7 | 51.2 | 79.1 | 0.0 | 14.1 |
| GOVERNMENT | 1.3 | 1.4 | 2.4 | 6.3 | 38.3 | 3.3 | 2.9 | 0.0 | 2.3 |
| OTHER | 4.3 | 4.3 | 8.3 | 36.5 | 20.6 | 29.5 | 4.8 | 0.0 | 7.1 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Table 3.15, below, shows the maximum altitude attained by the different aircraft types. In general, the more sophisticated the aircraft, the higher the altitude flown. Only turbojets flew higher than 45,000 feet above mean sea level (MSL).

**TABLE 3.15 PERCENTAGE DISTRIBUTION OF MAXIMUM ALTITUDE BY AIRCRAFT TYPE**

| MAXIMUM ALTITUDE MSL (000) | AIRCRAFT TYPE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SINGLE ENGINE PISTON 1-3 | SINGLE ENGINE PISTON 4 AND OVER | MULTI-ENGINE PISTON | ROTORCRAFT PISTON | ROTORCRAFT TURBINE | TURBO-PROP | TURBO-JET | GLIDER |
| UNDER 2.5 | 23.9 | 14.7 | 12.3 | 71.4 | 23.9 | 9.3 | 8.5 | 0.0 |
| 2.5-4 | 45.5 | 33.8 | 14.6 | 7.2 | 54.7 | 4.3 | 5.4 | 0.0 |
| 5-9 | 25.5 | 40.6 | 45.5 | 21.4 | 19.1 | 25.1 | 1.2 | 0.0 |
| 10-14 | 4.9 | 9.9 | 19.3 | 0.0 | 0.0 | 19.2 | 3.1 | 100.0 |
| 15-19 | 0.2 | 0.8 | 5.3 | 0.0 | 0.0 | 19.5 | 8.5 | 0.0 |
| 20-24 | 0.0 | 0.2 | 2.4 | 0.0 | 2.3 | 15.5 | 7.9 | 0.0 |
| 25-29 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 6.2 | 6.8 | 0.0 |
| 30-34 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.5 | 7.3 | 0.0 |
| 35-39 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 26.9 | 0.0 |
| 40-44 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 21.4 | 0.0 |
| MORE 45 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.0 | 0.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

For the first time in the General Aviation Pilot and Aircraft Activity Survey, information was collected on the Mode C capability of the general aviation fleet. Mode C is a type of transponder avionics equipment. Tables 3.16 through 3.21 present data about Mode C capability in the general aviation fleet. Table 3.16 shows that almost all of the more sophisticated aircraft have Mode C capability.

TABLE 3.16 PERCENTAGE MODE C EQUIPPED AIRCRAFT BY AIRCRAFT TYPE

| AIRCRAFT TYPE | YES | NO |
|---|---|---|
| SINGLE ENGINE PISTON 1-3 | 61.9 | 38.1 |
| SINGLE ENGINE PISTON 4 AND OVER | 88.7 | 11.3 |
| MULTI-ENGINE PISTON | 96.7 | 3.3 |
| ROTORCRAFT PISTON | 75.3 | 24.7 |
| ROTORCRAFT TURBINE | 88.6 | 11.4 |
| TURBOPROP | 97.1 | 2.9 |
| TURBOJET | 99.2 | 0.8 |
| GLIDER | 0.0 | 100.0 |

Table 3.17, below, shows that the majority of pilots interviewed indicated that their aircraft were equipped with Mode C. Of the ATP pilots interviewed, 95.5 percent indicated that their aircraft were equipped with Mode C. About half of the foreign pilots (49.8 percent) interviewed indicated their aircraft were equipped with Mode C.

TABLE 3.17 PERCENTAGE OF PILOTS WITH MODE C EQUIPPED AIRCRAFT BY TYPE OF PILOT CERTIFICATE

| PILOT CERTIFICATE | YES | NO |
|---|---|---|
| STUDENT | 73.1 | 26.9 |
| PRIVATE | 83.5 | 16.5 |
| COMMERCIAL | 84.2 | 15.8 |
| ATP | 95.5 | 4.5 |
| FOREIGN | 49.8 | 50.2 |

According to Table 3.18, below, and Table 3.19, on the bottom of this page, all pilot categories except the "under 16" age group found Mode C helpful for navigating the National Aerospace System (NAS).

TABLE 3.18 MODE C ASSISTANCE IN NAVIGATING THE NATIONAL AEROSPACE SYSTEM (NAS) BY PILOT AGE

| PILOT AGE | MODE C ASSIST | |
|---|---|---|
| | YES | NO |
| UNDER 16 | 4.3 | 95.7 |
| 16-19 | 83.3 | 16.7 |
| 20-24 | 74.9 | 25.1 |
| 25-29 | 80.5 | 19.5 |
| 30-34 | 80.9 | 19.1 |
| 35-39 | 76.1 | 23.9 |
| 40-44 | 80.5 | 19.5 |
| 45-49 | 80.3 | 19.7 |
| 50-54 | 80.9 | 19.1 |
| 55-59 | 79.7 | 20.3 |
| 60 AND OVER | 77.9 | 22.1 |

TABLE 3.19 MODE C ASSISTANCE BY PILOT CERTIFICATE

| PILOT CERTIFICATE | MODE C ASSISTANCE | |
|---|---|---|
| | YES | NO |
| STUDENT | 62.3 | 37.7 |
| PRIVATE | 77.1 | 22.9 |
| COMMERCIAL | 77.9 | 22.1 |
| ATP | 83.9 | 16.1 |
| FOREIGN | 94.3 | 5.7 |

Table 3.20, below, and Table 3.21, on the bottom of this page, show that the majority of pilots did not have any problem using Mode C. Even the student pilots did not indicate that they had any problem in using Mode C.

TABLE 3.20 MODE C PROBLEMS BY PILOT AGE

| PILOT AGE | MODE C PROBLEMS | |
|---|---|---|
| | YES | NO |
| UNDER 16 | 0.0 | 100.0 |
| 16-19 | 3.9 | 96.1 |
| 20-24 | 11.1 | 88.9 |
| 25-29 | 5.3 | 94.7 |
| 30-34 | 7.2 | 92.8 |
| 35-39 | 7.5 | 92.5 |
| 40-44 | 5.9 | 94.1 |
| 45-49 | 6.6 | 93.4 |
| 50-54 | 5.9 | 94.1 |
| 55-59 | 7.9 | 92.1 |
| 60 AND OVER | 5.7 | 94.3 |

TABLE 3.21 MODE C PROBLEMS BY PILOT CERTIFICATE

| PILOT CERTIFICATE | MODE C PROBLEMS | |
|---|---|---|
| | YES | NO |
| STUDENT | 2.6 | 97.4 |
| PRIVATE | 6.5 | 93.5 |
| COMMERCIAL | 9.1 | 90.9 |
| ATP | 5.1 | 94.9 |
| FOREIGN | 0.4 | 99.6 |

# CHAPTER IV

## UTILIZATION OF WEATHER INFORMATION SERVICE

Several questions in the 1990 FAA/CAP survey were devoted to the extent of pilots' use of preflight and inflight weather information. This chapter presents data on pilots' use of services providing preflight and inflight weather information by type of pilot certificate, purpose of flight and type of aircraft.

Numerous sources of weather information are available to pilots. Preflight weather information may be obtained from the FAA through Flight Service Station (FSS) briefings, Pilots Automatic Telephone Weather Answering Service (PATWAS), Transcribed Weather Broadcasts (TWEB), Voice Response System (VRS), and Airport Terminal Information Service (ATIS) broadcasts. Other sources of preflight weather information include National Oceanographic and Atmospheric Administration (NOAA) broadcasts, National Weather Service (NWS) briefings, television, radio and newspaper reports.

Airborne pilots can receive inflight weather information from various FAA sources, including Enroute Flight Advisory Service (EFAS); Flight Watch, Airport Terminal Information Service (ATIS) broadcasts; FSS hourly broadcasts; TWEB broadcasts--both NDB (Non-Directional Beacon) and VOR (Very high frequency Omnidirectional Radio range); and direct contact with FSS, Air Route Traffic Control Centers or control towers.

Tables 4.1 and 4.2 on the following page show, by pilot certificate, the percentage of pilots who used FAA or other sources of preflight and inflight weather information for local and cross-country flights, respectively. In local flight, most pilots did not seek preflight or inflight weather information. Of those pilots who did obtain preflight or inflight weather information for local flights, the majority obtained this weather information from FAA sources.

In cross-country flights, close to 80 percent of all pilots obtained weather information from FAA sources. Of those pilots who obtained inflight weather information for cross-country flight, nearly 97 percent used FAA sources. The remaining 3 percent of pilots obtained their weather information for cross-country flight from some other source.

TABLE 4.1 PERCENTAGE UTILIZATION OF PREFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT AND PILOT CERTIFICATE

| LOCAL PREFLIGHT WEATHER INFORMATION | | | PILOT CERTIFICATE | CROSS-COUNTRY PREFLIGHT WEATHER INFORMATION | | |
|---|---|---|---|---|---|---|
| FAA | OTHER | NONE | | FAA | OTHER | NONE |
| 47.3 | 14.2 | 38.5 | STUDENT | 91.9 | 3.2 | 4.9 |
| 47.9 | 12.9 | 39.2 | PRIVATE | 77.9 | 10.6 | 11.5 |
| 51.6 | 15.9 | 32.5 | COMMERCIAL | 80.5 | 12.3 | 7.2 |
| 53.6 | 20.7 | 25.7 | ATP | 73.6 | 23.7 | 2.7 |
| 50.0 | 0.0 | 50.0 | FOREIGN | 66.7 | 26.7 | 6.6 |
| 49.3 | 14.5 | 36.2 | ALL CERTIFICATES | 78.5 | 13.7 | 7.8 |

TABLE 4.2 PERCENTAGE UTILIZATION OF INFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT AND PILOT CERTIFICATE

| LOCAL INFLIGHT WEATHER INFORMATION | | | PILOT CERTIFICATE | CROSS-COUNTRY INFLIGHT WEATHER INFORMATION | | |
|---|---|---|---|---|---|---|
| FAA | OTHER | NONE | | FAA | OTHER | NONE |
| 31.0 | 1.5 | 67.5 | STUDENT | 40.4 | 1.2 | 58.4 |
| 21.7 | 0.6 | 77.7 | PRIVATE | 44.8 | 0.9 | 54.3 |
| 20.8 | 1.2 | 78.0 | COMMERCIAL | 47.7 | 1.0 | 51.3 |
| 27.2 | 4.2 | 68.6 | ATP | 57.4 | 3.3 | 39.3 |
| 50.0 | 0.0 | 50.0 | FOREIGN | 73.4 | 0.0 | 26.6 |
| 23.5 | 1.2 | 75.3 | ALL CERTIFICATES | 48.4 | 1.5 | 50.1 |

Table 4.3 presents pilots' overall utilization of preflight and inflight weather information by type of flight.

TABLE 4.3 OVERALL PERCENTAGE UTILIZATION OF PREFLIGHT AND INFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT

| TYPE OF FLIGHT | WEATHER INFORMATION SERVICE UTILIZED | | | |
|---|---|---|---|---|
| | PREFLIGHT AND INFLIGHT | PREFLIGHT BUT NOT INFLIGHT | INFLIGHT BUT NOT PREFLIGHT | NEITHER PREFLIGHT NOR INFLIGHT |
| LOCAL | 22.8 | 45.2 | 4.1 | 27.9 |
| CROSS-COUNTRY | 53.9 | 39.7 | 1.3 | 5.1 |

Utilization of weather information service is more important for cross-country flights than for local flights, yet weather information service is used heavily by pilots for both types of flight. Some type of weather information service was used by pilots 72.1 percent of the time for local flights and 94.9 percent of the time for cross-country flights.

Of the pilots who obtained local flight weather information, 68.0 percent obtained it before departure, while 93.6 percent of the cross-country pilots obtained preflight weather information. In cross-country flights, 53.9 percent of the pilots interviewed used both preflight and inflight weather information services, while only 22.8 percent of pilots in local flight did so. For both local and cross-country flight, very little inflight weather information service was used without preflight service first.

Table 4.4 on page 4-4 arrays the utilization of weather information by type of flight over the last three surveys.

The use of preflight and inflight weather information has been increasing since 1981 for both local and cross-country flying, but especially for local flights. For local flights, the use of preflight but not inflight weather information has increased from 32.0 percent in 1981 to 39.9 percent in 1984 to 45.2 percent in 1990. However, for cross-country flights, the usage of weather information has increased only modestly from already high levels without much change in the mix of preflight versus preflight/inflight.

**TABLE 4.4 OVERALL UTILIZATION OF PREFLIGHT AND INFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT FOR SURVEY YEARS 1981, 1984 AND 1990**

| TYPE OF FLIGHT | WEATHER INFORMATION SERVICE UTILIZED | | | | | |
|---|---|---|---|---|---|---|
| | BOTH PREFLIGHT AND INFLIGHT | | | NEITHER PREFLIGHT NOR INFLIGHT | | |
| | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 |
| LOCAL | 18.1 | 24.5 | 22.8 | 43.7 | 30.8 | 27.9 |
| CROSS-COUNTRY | 50.9 | 49.6 | 53.9 | 9.3 | 6.9 | 5.1 |

| TYPE OF FLIGHT | WEATHER INFORMATION SERVICE UTILIZED | | | | | |
|---|---|---|---|---|---|---|
| | PREFLIGHT BUT NOT INFLIGHT | | | INFLIGHT BUT NOT PREFLIGHT | | |
| | 1981 | 1984 | 1990 | 1981 | 1984 | 1990 |
| LOCAL | 32.0 | 39.9 | 45.2 | 6.2 | 4.8 | 4.1 |
| CROSS-COUNTRY | 36.8 | 41.4 | 39.7 | 3.0 | 2.1 | 1.3 |

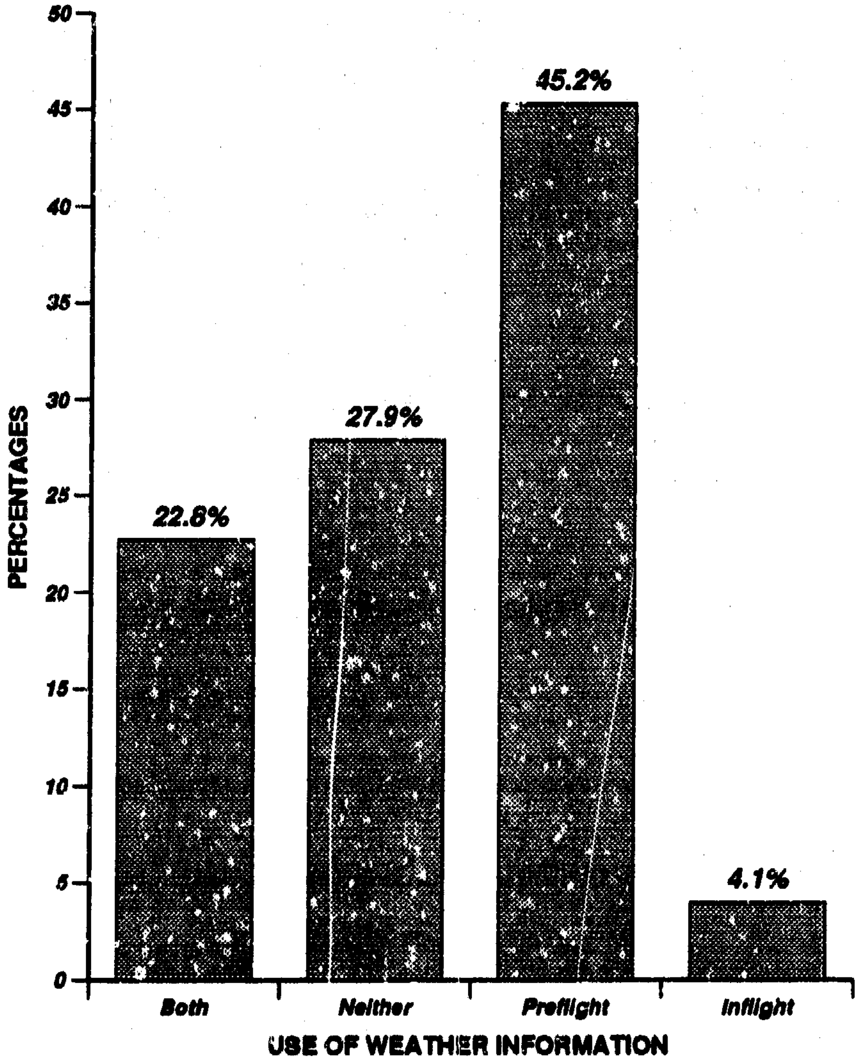
For both local and cross-country flights, the most significant changes were observed in the decrease of pilots' not using weather information service. The use of neither preflight nor inflight weather information has steadily decreased from 43.7 percent in 1981, to 30.8 percent in 1984, and 27.9 percent in 1990 for local flights, and from 9.3 percent in 1981, to 6.9 percent in 1984, and 5.1 percent in 1990 for cross-country flights.

Figure 4.1 displays the percentage utilization of services providing preflight and inflight weather information by local flight for the 1990 survey year.

Figure 4.2 displays the percentage utilization of services providing preflight and inflight weather information by cross-country flight for the 1990 survey year.

**Figure 4.1**

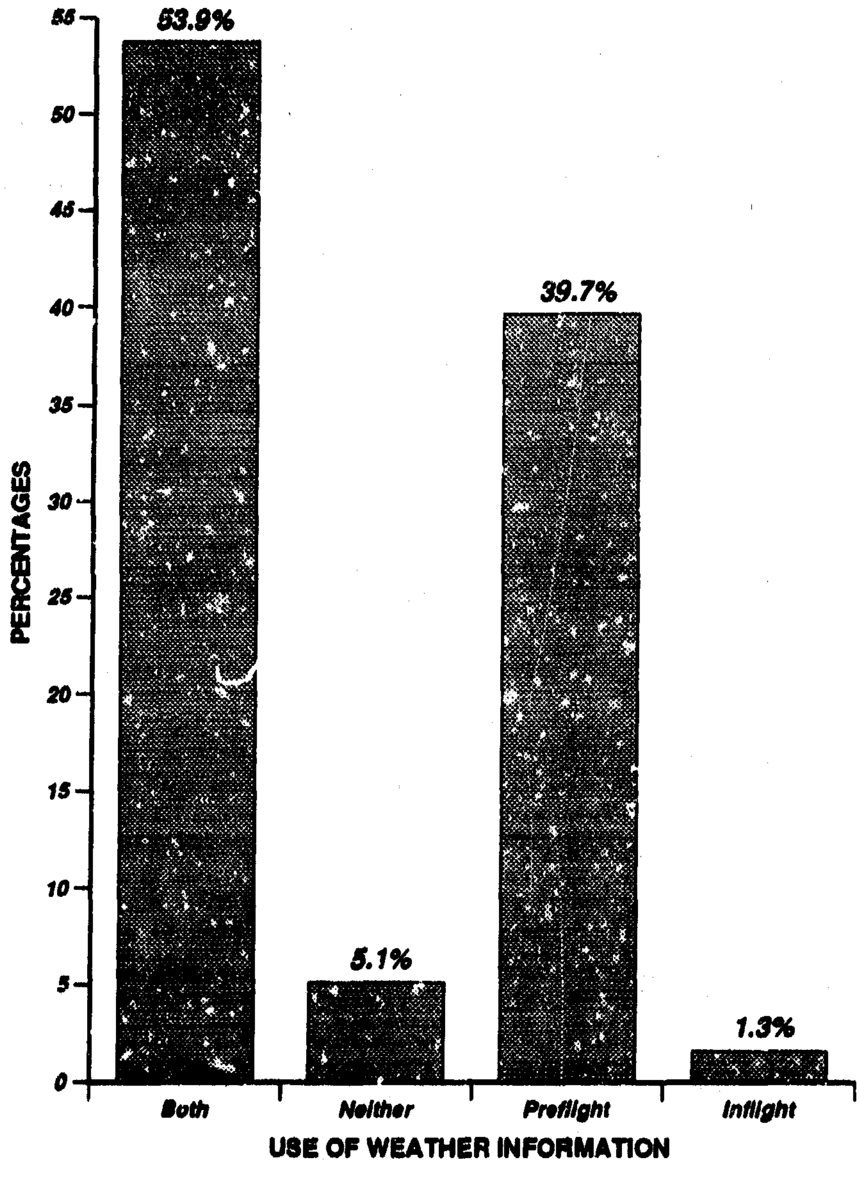
# 1990 PERCENT UTILIZATION OF SERVICES PROVIDING PREFLIGHT AND INFLIGHT WEATHER INFORMATION BY LOCAL FLIGHT




*SOURCE: Table 4.4*

Figure 4.2

# 1990 PERCENT UTILIZATION OF SERVICES PROVIDING PREFLIGHT AND INFLIGHT WEATHER INFORMATION BY CROSS-COUNTRY FLIGHT




SOURCE: Table 4.4

Tables 4.5 and 4.6 consider, by aircraft type and type of flight, the use of preflight and inflight weather information services, respectively. In general, the more sophisticated the aircraft, the greater the likelihood that preflight weather information was obtained for both local and cross-country flights.

TABLE 4.5 PERCENTAGE UTILIZATION OF PREFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT AND TYPE OF AIRCRAFT

| LOCAL PREFLIGHT WEATHER INFORMATION | | | TYPE OF AIRCRAFT | CROSS-COUNTRY PREFLIGHT WEATHER INFORMATION | | |
|---|---|---|---|---|---|---|
| FAA | OTHER | NONE | | FAA | OTHER | NONE |
| 45.0 | 15.4 | 39.6 | SINGLE-ENGINE PISTON (1-3 SEATS) | 75.2 | 12.1 | 12.7 |
| 50.9 | 13.9 | 35.2 | SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 79.9 | 11.0 | 9.1 |
| 61.6 | 17.2 | 21.2 | MULTI-ENGINE PISTON | 82.5 | 12.4 | 5.1 |
| 48.9 | 2.1 | 49.0 | ROTORCRAFT PISTON | 85.8 | 0.0 | 14.2 |
| 56.2 | 18.7 | 25.1 | ROTORCRAFT TURBINE | 80.9 | 9.6 | 9.5 |
| 66.7 | 16.6 | 16.7 | TURBOPROP | 72.2 | 25.9 | 1.9 |
| 100.0 | 0.0 | 0.0 | TURBOJET | 75.6 | 24.4 | 0.0 |
| 33.3 | 0.0 | 66.6 | GLIDER | 100.0 | 0.0 | 0.0 |
| 49.3 | 14.5 | 36.2 | ALL AIRCRAFT | 78.5 | 13.8 | 7.7 |

Pilots of turbojets made the greatest use of FAA preflight weather information for local flights, 100.0 percent. For cross-country flights, pilots flying gliders and rotorcraft piston took the greatest advantage of the FAA preflight weather information services, with 100.0 percent and 85.8 percent, respectively. Rotorcraft and single engine piston aircraft were somewhat more likely not to obtain preflight weather information before a cross-country flight.

In Table 4.6 below, it is seen that, across all aircraft types, local inflight weather information is only obtained 23.5 percent of the time from FAA sources. Use of inflight weather information more than doubles to 48.5 percent for cross-country flights reflecting substantial increases for all aircraft types except gliders.

**TABLE 4.6 PERCENTAGE UTILIZATION OF INFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT AND TYPE OF AIRCRAFT**

| LOCAL INFLIGHT WEATHER INFORMATION | | | TYPE OF AIRCRAFT | CROSS-COUNTRY INFLIGHT WEATHER INFORMATION | | |
|---|---|---|---|---|---|---|
| FAA | OTHER | NONE | | FAA | OTHER | NONE |
| 21.3 | 0.6 | 78.1 | SINGLE-ENGINE PISTON (1-3 SEATS) | 39.0 | 0.8 | 60.2 |
| 23.9 | 1.8 | 74.3 | SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 46.8 | 0.8 | 52.4 |
| 28.3 | 0.0 | 71.7 | MULTI-ENGINE PISTON | 49.3 | 2.0 | 48.7 |
| 40.8 | 2.0 | 57.2 | ROTORCRAFT PISTON | 28.5 | 0.0 | 71.5 |
| 28.2 | 0.0 | 71.8 | ROTORCRAFT TURBINE | 47.6 | 2.4 | 50.0 |
| 38.8 | 5.6 | 55.6 | TURBOPROP | 60.8 | 3.4 | 35.8 |
| 16.6 | 0.0 | 83.4 | TURBOJET | 64.0 | 4.3 | 31.7 |
| 33.3 | 0.0 | 66.6 | GLIDER | 0.0 | 0.0 | 100.0 |
| 23.5 | 1.2 | 75.3 | ALL AIRCRAFT | 48.5 | 1.5 | 50.0 |

Tables 4.7 and 4.8 show the percentage utilization of preflight and inflight weather information service by type and purpose of flight, respectively. In general, FAA weather information services are heavily in demand regardless of the purpose of the flight, with the exception of commuter air carriers. Since most commuter air carriers have their own weather information services, they did not use FAA weather information services as often as other types of flight.

TABLE 4.7 PERCENTAGE UTILIZATION OF PREFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT AND PURPOSE OF FLIGHT

| LOCAL PREFLIGHT WEATHER INFORMATION | | | PURPOSE OF FLIGHT | CROSS-COUNTRY PREFLIGHT WEATHER INFORMATION | | |
|---|---|---|---|---|---|---|
| FAA | OTHER | NONE | | FAA | OTHER | NONE |
| 48.2 | 14.6 | 37.2 | PERSONAL | 77.5 | 13.9 | 8.6 |
| 49.5 | 17.3 | 33.2 | BUSINESS | 81.0 | 12.4 | 6.6 |
| 92.5 | 5.2 | 2.3 | EXECUTIVE/CORPORATE | 80.8 | 17.6 | 1.6 |
| 33.4 | 55.4 | 11.2 | COMMUTER AIR CARRIER | 54.5 | 45.3 | 0.2 |
| 81.5 | 5.8 | 12.7 | AIR TAXI | 76.0 | 19.1 | 4.9 |
| 55.5 | 16.4 | 28.1 | INSTRUCTIONAL | 85.6 | 10.9 | 3.5 |
| 27.4 | 21.2 | 51.4 | AERIAL APPLICATION | 78.1 | 0.0 | 21.9 |
| 68.2 | 26.4 | 5.4 | INDUSTRIAL | 56.5 | 7.6 | 35.9 |
| 49.3 | 14.5 | 36.2 | ALL FLIGHTS | 78.5 | 13.8 | 7.7 |

TABLE 4.8 PERCENTAGE UTILIZATION OF INFLIGHT WEATHER INFORMATION SERVICE BY TYPE OF FLIGHT AND PURPOSE OF FLIGHT

| LOCAL INFLIGHT WEATHER INFORMATION | | | PURPOSE OF FLIGHT | CROSS-COUNTRY INFLIGHT WEATHER INFORMATION | | |
|---|---|---|---|---|---|---|
| FAA | OTHER | NONE | | FAA | OTHER | NONE |
| 22.7 | 0.6 | 76.7 | PERSONAL | 48.2 | 0.9 | 50.9 |
| 19.7 | 3.4 | 76.9 | BUSINESS | 53.2 | 0.8 | 46.0 |
| 9.7 | 0.0 | 90.3 | EXECUTIVE/CORPORATE | 59.1 | 1.7 | 39.2 |
| 57.9 | 15.6 | 26.5 | COMMUTER AIR CARRIER | 59.9 | 9.9 | 30.2 |
| 23.9 | 0.0 | 76.1 | AIR TAXI | 55.6 | 2.8 | 41.6 |
| 26.4 | 2.7 | 70.9 | INSTRUCTIONAL | 49.8 | 1.4 | 48.8 |
| 23.6 | 4.6 | 71.8 | AERIAL APPLICATION | 40.9 | 0.0 | 59.1 |
| 54.6 | 0.0 | 45.4 | INDUSTRIAL | 32.2 | 2.6 | 65.2 |
| 23.5 | 1.2 | 75.3 | ALL FLIGHTS | 48.5 | 1.5 | 50.0 |

For local flights, an estimated 90.3 percent of the executive/corporate flights did not use inflight weather information, while for cross-country flights, an estimated 59.1 percent of the executive/corporate flights used FAA-provided inflight weather information.

An estimated 57.9 percent of the local commuter carrier flights used FAA-provided inflight weather information, while an estimated 59.9 percent of the cross-country commuter carrier flights used FAA-provided inflight weather information.

For industrial flights, an estimated 54.6 percent of pilots used local inflight weather information, while an estimated 65.2 percent of the cross-country industrial flights did not.

Overall, 75.3 percent of all local flight purposes did not use inflight weather information, compared with an estimated 48.5 percent of all cross-country flights which did not use inflight weather information.

## CHAPTER V

## AIRPORT FACILITY RATINGS AND PREFERENCES

Another major objective of the 1990 FAA/CAP survey was to obtain pilots' ratings of the facilities provided at the surveyed airports, as well as their facility preferences at destination airports.

The pilots who took part in the survey were asked to rate the survey site airport in terms of its location, approach zone condition, runway length, runway condition, runway lighting (if lighted) and Fixed Base Operator (FBO) service (if available). Table 5.1 presents the responses. Over 97 percent of pilots surveyed replied that most of these requirements, except for Fixed Base Operator (FBO) service, were adequate at the survey site airport. In terms of poor facilities, only 6.2 percent of the pilots interviewed rated the FBO service poorly. FBO service was rated as adequate or better by 93.8 percent of pilots interviewed.

**TABLE 5.1 AIRPORT FACILITY RATINGS AT SURVEY SITE AIRPORT**

| FACILITIES | VERY WELL | ADEQUATELY | POORLY |
|---|---|---|---|
| AIRPORT LOCATION | 79.6 | 19.7 | 0.7 |
| APPROACH ZONE CONDITION | 71.3 | 25.9 | 2.8 |
| RUNWAY LENGTH | 78.3 | 19.7 | 2.0 |
| RUNWAY CONDITION | 76.8 | 20.1 | 3.1 |
| RUNWAY LIGHTING[18] | 74.2 | 22.8 | 3.0 |
| FBO SERVICE[19] | 68.2 | 25.6 | 6.2 |

The pilots were also asked for their preference of airport facilities at a destination airport. The facilities offered included a control tower, a runway over 5,000 feet, runway lighting, Very high frequency Omnidirectional Radio range/Distance Measurement Equipment (VOR/DME) approach, Instrument Landing System/Microwave Landing System (ILS/MLS) approach and Fixed Base Operator (FBO) service. Table 5.2 presents the responses. The top two facilities preferred were FBO service with 88.0 percent and runway lighting with 87.9 percent. The least desired facilities were those with a control tower (56.8 percent) and facilities with a runway over 5,000 feet (56.6 percent).

[18] If available at this airport.

[19] If available at this airport.

**TABLE 5.2 AIRPORT FACILITY PREFERENCES AT DESTINATION AIRPORT**

| FACILITIES | YES | DON'T CARE | NO |
|---|---|---|---|
| A CONTROL TOWER | 56.8 | 35.1 | 8.1 |
| RUNWAY OVER 5,000 FEET | 56.6 | 36.8 | 6.6 |
| RUNWAY LIGHTING | 87.9 | 10.1 | 2.0 |
| VOR/DME APPROACH | 74.4 | 21.9 | 3.7 |
| ILS/MLS APPROACH | 75.2 | 20.7 | 4.1 |
| FBO SERVICE | 88.0 | 10.3 | 1.7 |

In the 1990 survey, 87.9 percent of pilots interviewed indicated that they preferred destination airports to have runway lighting. 74.4 percent of the pilots indicated that they preferred destination airports to have VOR/DME, and 75.2 percent indicated they preferred ILS/MLS approaches. These figures are about 10 percent higher than those reported in the 1984 survey.

## CHAPTER VI

## FUEL CONSUMPTION AND AIRCRAFT MILES FLOWN

### A. FUEL CONSUMPTION

Another major objective of the 1990 FAA/CAP survey was to estimate 1989 total fuel consumption and 1989 nautical miles flown by the general aviation fleet. The estimates of 1989 fuel consumption are calculated by multiplying each aircraft type's total hours flown in 1989 by the average fuel consumed by each aircraft type. Data for total hours flown were obtained from the FAA's <u>1989 General Aviation Activity and Avionics Survey</u>. Average fuel consumption rates were obtained directly from the interviewed pilots.

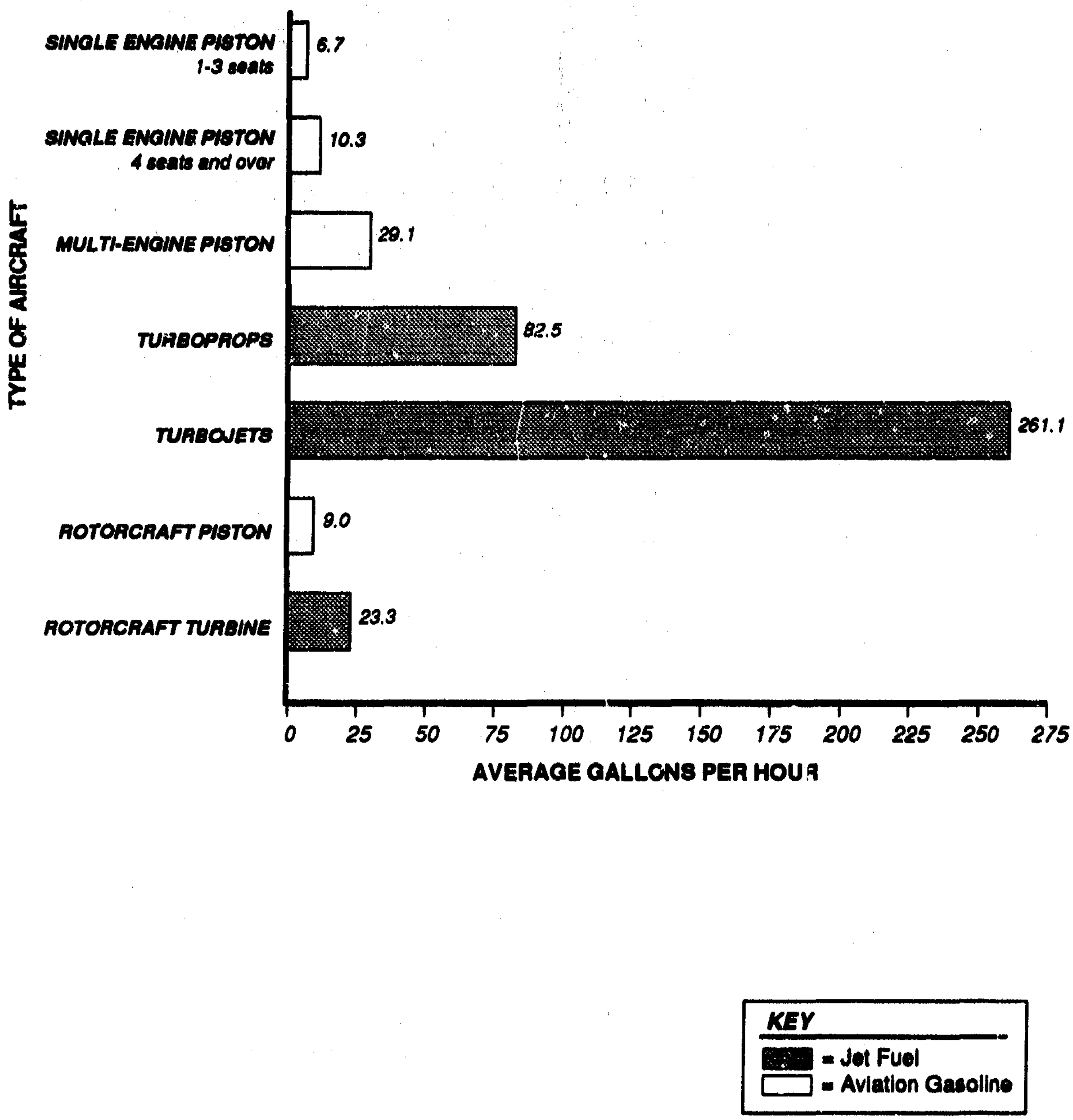
The results of these calculations are presented in Table 6.1 and graphically displayed in Figures 6.1 and 6.2.

TABLE 6.1 ESTIMATES OF AVERAGE FUEL CONSUMPTION AND TOTAL FUEL CONSUMPTION FOR 1989

| TYPE OF AIRCRAFT | AVERAGE FUEL CONSUMED (GALLONS PER HOUR) | | AIRCRAFT HOURS FLOWN IN 1989 (THOUSANDS) | TOTAL FUEL CONSUMED (MILLIONS GALLONS) | |
|---|---|---|---|---|---|
| | AVIATION GASOLINE | JET FUEL | | AVIATION GASOLINE | JET FUEL |
| SINGLE-ENGINE PISTON (1-3 SEATS) | 6.7 | | 8,312 | 55.7 | |
| SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 10.3 | | 13,995 | 144.1 | |
| MULTI-ENGINE PISTON | 29.1 | | 4,648 | 135.3 | |
| ROTORCRAFT PISTON | 9.0 | | 749 | 6.7 | |
| ROTORCRAFT TURBINE | | 23.3 | 2,080 | | 48.5 |
| TURBOPROP | | 82.5 | 3,132 | | 258.4 |
| TURBOJET | | 261.1 | 1,654 | | 431.8 |
| TOTAL | | | | 341.8 | 738.7 |

**Figure 6.1**

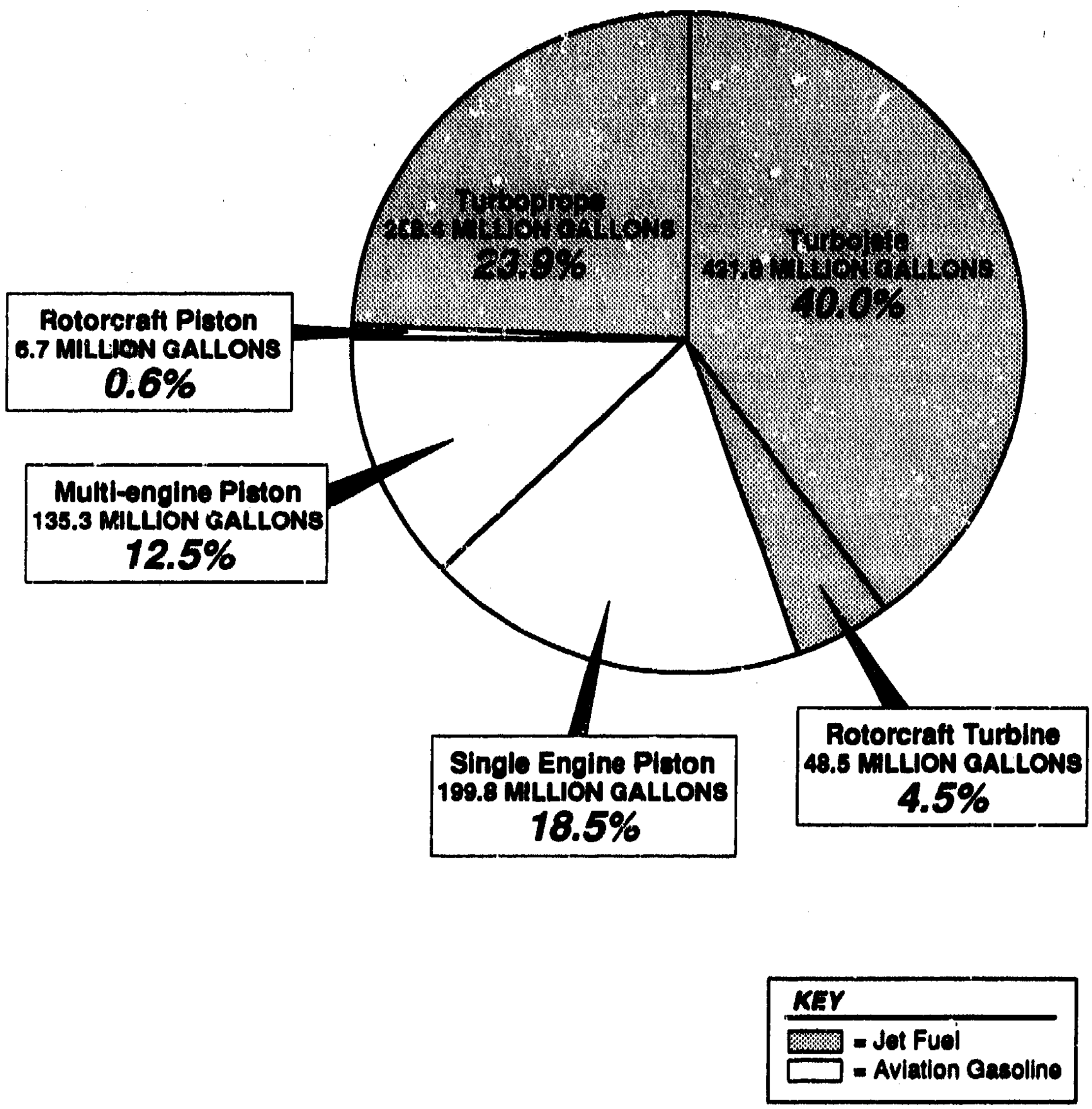
# 1989 ESTIMATED AVERAGE FUEL CONSUMPTION PER HOUR BY AIRCRAFT TYPE




SOURCE: Table 6.1

**Figure 6.2**

# 1989 ESTIMATED TOTAL FUEL CONSUMPTION BY AIRCRAFT TYPE




***SOURCE: Table 6.1***

The most current fuel consumption data available is for calendar year 1989. The comparative analysis with the 1981 and 1984 FAA/CAP survey data has to be made with comparable fuel consumption data for calendar years 1980 and 1983, respectively.

In 1989, an estimated 341.8 million gallons of aviation gasoline and 738.7 million gallons of jet fuel were consumed. The consumption of aviation fuel has steadily declined from 451.3 million gallons in 1980, to 388.0 million gallons in 1983, and 341.8 million gallons in 1989. In contrast, consumption of jet fuel has steadily increased from 500.3 million gallons in 1981, to 552.5 million gallons in 1983 and 738.7 million gallons in 1989.

Table 6.2 compares the 1989 fuel consumption estimates derived from the 1989 General Aviation Activity and Avionics Survey (GAAA Survey) with the estimates derived in this survey (1990 Pilot Survey).

TABLE 6.2 1989 FUEL CONSUMPTION ESTIMATES FROM THE 1989 GENERAL AVIATION ACTIVITY AND AVIONICS SURVEY AND THE 1990 GENERAL AVIATION PILOT AND AIRCRAFT ACTIVITY SURVEY

| FUEL CONSUMPTION ESTIMATES | | | | |
|---|---|---|---|---|
| | 1990 PILOT SURVEY | | 1989 GAAA SURVEY | |
| AIRCRAFT TYPE | AVIATION GAS | JET FUEL | AVIATION GAS | JET FUEL |
| SINGLE-ENGINE PISTON (1-3 SEATS) | 55.7 | | 56.3 | |
| SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 144.1 | | 149.0 | |
| MULTI-ENGINE PISTON | 135.1 | | 134.6 | |
| TURBOPROP | | 258.4 | | 255.8 |
| TURBOJET | | 431.8 | | 431.9 |
| TOTAL | 334.9 | 690.2 | 339.9 | 687.7 |

Note that estimates of fuel consumption for all types of aircraft are similar in both surveys. Rotorcraft are not included in this comparison for no data on rotorcraft fuel consumption was collected in the 1989 General Aviation Activity and Avionics Survey.

## B. NAUTICAL MILES FLOWN

An estimate was also made of total nautical aircraft miles flown in general aviation using a combination of General Aviation Pilot and Aircraft Activity survey data and data obtained from the FAA's 1989 General Aviation Activity and Avionics Survey.

The following methodology was employed to obtain an estimate of the total 1989 nautical aircraft miles flown in general aviation for 1989 by aircraft type:

1. The local versus cross-country breakdown of flights by aircraft type was obtained from Table 3.6. The percentages were used as proxies for percentages of hours flown in local or cross-country flights.

2. Total hours flown for each aircraft type were obtained from the FAA's 1989 General Aviation Activity and Avionics Survey. The hours were divided into local and cross-country, using the percentages from step 1.

3. Average local and cross-country speeds were obtained from the 1990 FAA/CAP survey data. The local speed was obtained from Table 3.2. Cross-country speed was calculated as average last leg distance divided by average last leg time from Table 3.4 and then converted from speed per minute to speed per hour for each aircraft type.

4. Average speed was then multiplied by hours flown for each aircraft type for local and cross-country flights to obtain estimates of nautical miles flown by aircraft type.

5. Estimates of total nautical miles flown for both local and cross-country were obtained by summing the estimates over all aircraft types.

The results of these calculations are presented in Table 6.3 on the following page. The estimated 1989 nautical miles flown by type of flight are graphically depicted in Figure 6.3 on page 6-7.

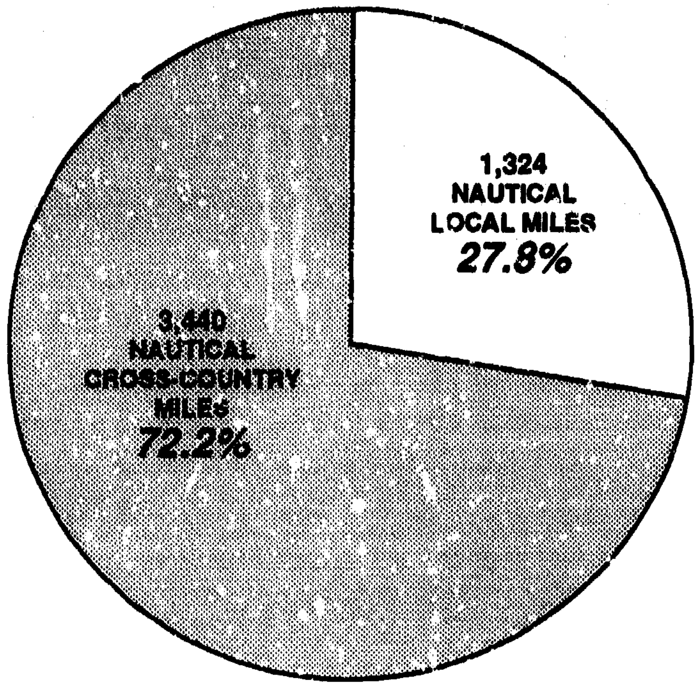
TABLE 6.3 ESTIMATES OF AIRCRAFT MILES FLOWN IN 1989 BY AIRCRAFT TYPE

| TYPE OF AIRCRAFT | LOCAL | | | CROSS-COUNTRY | | |
|---|---|---|---|---|---|---|
| | HOURS FLOWN (THOUS.) | AVERAGE SPEED (KNOTS) | MILES FLOWN (MILS.) | HOURS FLOWN (THOUS.) | AVERAGE SPEED (KNOTS) | MILES FLOWN (MILS.) |
| SINGLE-ENGINE PISTON (1-3 SEATS) | 5,311 | 92 | 489 | 3,001 | 95 | 285 |
| SINGLE-ENGINE PISTON (4 SEATS AND OVER) | 5,178 | 110 | 570 | 8,817 | 124 | 1,093 |
| MULTI-ENGINE PISTON | 748 | 149 | 111 | 3,900 | 155 | 605 |
| ROTORCRAFT PISTON | 615 | 66 | 41 | 134 | 99 | 13 |
| ROTORCRAFT TURBINE | 818 | 94 | 77 | 1,260 | 99 | 125 |
| TURBOPROP | 113 | 167 | 19 | 3,019 | 197 | 595 |
| TURBOJET | 83 | 207 | 17 | 1,571 | 461 | 724 |
| TOTAL | | | 1,324 | | | 3,440 |

Based on the Table 6.3 estimates, the general aviation fleet flew an estimated 4,764 million nautical miles in 1989 as compared to 4,478 million nautical miles obtained from the 1989 General Aviation Activity and Avionics Survey. Between 1983 and 1989, local flight nautical miles flown increased by more than 30 million miles. Over the same time period, cross-country flight miles flown increased by 504 million nautical miles. These changes result from a slight increase in the number of hours flown in local flight, despite a decrease of almost 2 million flight hours in cross-country flight.

Figure 6.3

## 1989 ESTIMATED NAUTICAL MILES FLOWN BY TYPE OF FLIGHT




**Total 1989 Estimated Nautical Miles Flown: 4,764**

*SOURCE: Table 6.3*

## CHAPTER VII

## TOTAL 1990 GENERAL AVIATION OPERATIONS AND TRAFFIC PATTERNS

The 1990 FAA/CAP survey also sought to determine the estimated total number of general aviation operations which occurred in 1990. An operation is defined as a take-off or landing. A touch and go is counted as two operations. This chapter presents data on the number of general aviation operations and traffic patterns by type of airport, purpose of flight and time of day.

The traffic count data collected at the surveyed airports were used to estimate the total number of general aviation operations which occurred in 1990. An estimate was derived for each of the four airport types and summed over airport types to determine an overall total. This approach grouped together airports which were expected to be homogeneous with respect to their daily traffic volume, since the facilities available at an airport are indicative of the traffic there.

For each airport type, an average daily traffic estimate was derived. Daily traffic is defined as the number of takeoffs plus the number of landings. In order to arrive at a daily estimate, it was necessary to make an estimate for each hour between 0600 and 2100 and sum the hourly estimates. This step was necessary because the hours of operation differed from airport to airport, as did the hours of observation. Partial hour observations were accounted for in the estimation procedure. Survey interruption periods were recorded and were also taken into account.

Table 7.1, below, shows the number of public-use airports, average daily operations and the number of estimated 1990 operations by type of airport.

**TABLE 7.1 ESTIMATES OF TOTAL 1990 GENERAL AVIATION OPERATIONS AT PUBLIC USE AIRPORTS**

| TYPE OF AIRPORT | NUMBER OF PUBLIC-USE AIRPORTS | AVERAGE DAILY OPERATIONS[20] | TOTAL 1990 OPERATIONS (MILLIONS) |
|---|---|---|---|
| TOWERED | 486 | 227 | 40.3 |
| NON-TOWERED | 4,914 | 49 | 88.1 |
| PAVED AND LIGHTED RUNWAYS | 2,509 | 70 | 64.1 |
| PAVED AND UNLIGHTED RUNWAYS | 939 | 31 | 10.6 |
| UNPAVED RUNWAYS | 1,466 | 25 | 13.4 |
| TOTAL | 5,400 | 65 | 128.4 |

[20] Adjusted for nighttime activity.

Estimates of the number of average daily operations and total 1990 operations were adjusted to account for seasonal and night/weekend fluctuations. The data from Table 7.1 are graphically depicted in Figure 7.1 on page 7-3.

As shown in Table 7.1, towered airports averaged 227 operations a day, while non-towered airports averaged 49 operations a day. However, the greatest number of operations, 88.1 million, took place at non-towered public-use airports. Overall, more than 128 million general aviation operations took place in 1990 at 5,400 public-use airports. Of the total 1990 operations, non-towered airports accounted for 69 percent, and towered airports accounted for 31 percent.

The data recorded on the Traffic Count forms were used to derive estimates of daily operations for each of the four airport types. A seasonal adjustment was made in the estimation process to account for the fact that the data were collected in the summer months and, therefore, may be subject to a seasonal bias. The resulting seasonally adjusted estimates of average daily activities by airport type are contained in Table 7.2 for weekdays (page 7-4) and Table 7.3 for weekends (page 7-5). Total 1990 operations for each class of airport were estimated by multiplying the daily averages by 365 and then by multiplying that figure by the number of airports in each class (see Appendix A, Section C, page A-2 for a more thorough explanation).

According to patterns identified through data collected on FAA's Air Traffic Reporting System, traffic volumes differ between weekdays and weekend days. Because of this difference, estimations of daily traffic profiles were performed separately for the two cases. The hourly traffic estimates over all airports for weekdays and weekend days are provided in Tables 7.3 and 7.4. An average daily estimate was calculated by weighting the weekday average by five and weighting the weekend average by two and then dividing the total by seven.

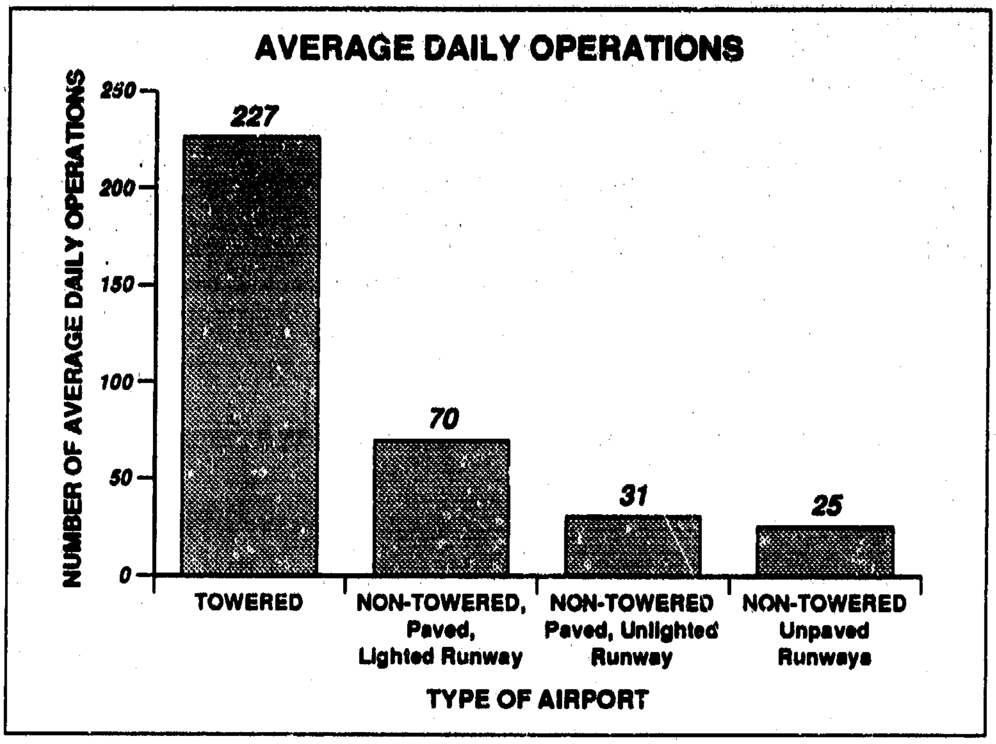
The airport type daily traffic estimates were adjusted to account for night traffic occurring between the hours of 2100 and 0600 at lighted airports. The adjustments were expressed as percentages of the traffic estimated for the 0600 to 2100 interval. The adjustment factors used were seven percent and three percent of estimated daily traffic for Type 1, towered airports, and Type 2, non-towered with paved and lighted runways, respectively. Type 3, paved and unlighted airports, and Type 4, unpaved and unlighted airports, were unadjusted because they are unlighted and do not operate at night.

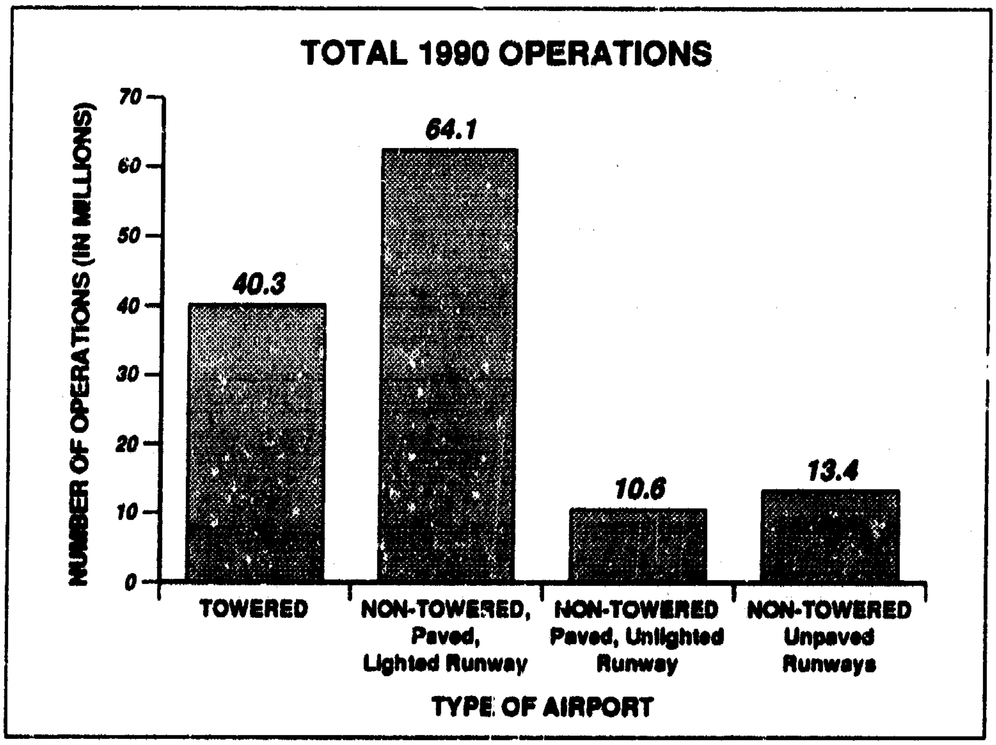
Since general aviation activity is affected by the climate, a seasonal influence on the level of activity occurs at different times of the year, particularly in regions with more pronounced seasonal weather patterns. The survey data were collected during the summer months; yet an annual estimate is desired. Therefore, the seasonal bias had to be removed before the annual estimate could be made.

Historical data collected at FAA towered airports were used to calculate quarterly seasonal patterns for each FAA region. The factors for the third quarter were applied to the individual airport traffic counts before the estimation was performed, yielding daily averages corrected for potential seasonal bias.

**Figure 7.1**

## ESTIMATES OF 1990 GENERAL AVIATION OPERATIONS BY AIRPORT TYPE




*SOURCE: Table 7.1*

**TABLE 7.2 SEASONALLY ADJUSTED WEEKDAY HOURLY GENERAL AVIATION TRAFFIC ESTIMATES**

| HOUR OF DAY | AIRPORT TYPE | | | |
|---|---|---|---|---|
| | TOWERED | NON-TOWERED | | |
| | | PAVED, LIGHTED RUNWAYS | PAVED, UNLIGHTED RUNWAYS | UNPAVED RUNWAYS |
| 0600-0659 | 5.6 | 0.5 | 0.3 | 0.0 |
| 0700-0759 | 10.9 | 2.9 | 0.0 | 0.0 |
| 0800-0859 | 14.7 | 3.7 | 0.3 | 0.9 |
| 0900-0959 | 15.1 | 4.9 | 0.9 | 1.5 |
| 1000-1059 | 15.0 | 5.9 | 1.2 | 1.8 |
| 1100-1159 | 15.6 | 6.2 | 1.2 | 2.0 |
| 1200-1259 | 15.7 | 5.1 | 1.2 | 1.9 |
| 1300-1359 | 15.1 | 5.0 | 3.8 | 3.1 |
| 1400-1459 | 16.1 | 6.3 | 11.5 | 3.1 |
| 1500-1559 | 15.7 | 5.6 | 3.7 | 2.4 |
| 1600-1659 | 19.0 | 6.4 | 5.0 | 2.5 |
| 1700-1759 | 14.8 | 5.9 | 4.3 | 1.6 |
| 1800-1859 | 16.7 | 5.3 | 0.3 | 2.2 |
| 1900-1959 | 14.2 | 3.7 | 0.3 | 2.5 |
| 2000-2059 | 13.9 | 2.2 | 0.0 | 1.2 |
| TOTAL | 218.1 | 69 6 | 34.0 | 26.7 |

On a daily basis, there is more airport traffic during the weekdays than on the weekend at all airport types. Towered airports are the busiest, more than twice as busy as the next closest airport type (paved, lighted runways).

Although traffic counts surveyed this year have decreased significantly from those reported in previous surveys, this is not perceived as an actual reduction in general aviation activity. Most likely this decrease is due to survey and data reduction methodologies. There are two causes for this inconsistency, weekly adjustment and incomplete reporting.

**TABLE 7.3 SEASONALLY ADJUSTED WEEKEND DAY HOURLY GENERAL AVIATION TRAFFIC ESTIMATES**

| HOUR OF DAY | AIRPORT TYPE | | | |
|---|---|---|---|---|
| | TOWERED | NON-TOWERED | | |
| | | PAVED, LIGHTED RUNWAYS | PAVED, UNLIGHTED RUNWAYS | UNPAVED RUNWAYS |
| 0600-0659 | 5.2 | 0.1 | 0.7 | 0.2 |
| 0700-0759 | 7.1 | 0.9 | 0.6 | 0.1 |
| 0800-0859 | 11.4 | 3.4 | 1.0 | 0.9 |
| 0900-0959 | 20.8 | 6.0 | 2.5 | 2.1 |
| 1000-1059 | 20.1 | 7.1 | 1.9 | 2.9 |
| 1100-1159 | 18.7 | 7.0 | 2.6 | 2.3 |
| 1200-1259 | 15.8 | 6.9 | 2.4 | 1.7 |
| 1300-1359 | 13.9 | 7.0 | 1.4 | 1.0 |
| 1400-1459 | 14.9 | 5.8 | 1.7 | 1.6 |
| 1500-1559 | 14.3 | 5.3 | 3.4 | 1.8 |
| 1600-1659 | 16.2 | 4.4 | 1.6 | 2.1 |
| 1700-1759 | 11.9 | 4.8 | 1.9 | 2.3 |
| 1800-1859 | 12.1 | 3.8 | 2.1 | 0.4 |
| 1900-1959 | 7.9 | 2.0 | 0.7 | 0.1 |
| 2000-2059 | 5.1 | 1.0 | 0.2 | 0.3 |
| TOTAL | 195.4 | 65.5 | 24.7 | 19.8 |

Adjustments were made to the data to allow for seasonal variances in activity; also, weekend observations were differentiated and allowance was made for night activity. However, no provision was made for weekday cycles during the week or month. Analysis of general aviation air traffic data collected through FAA's ongoing Air Traffic Reporting System indicated that, for the month of October, nearly 70 percent of the towered airport facilities had variances in weekday general aviation activity of a factor of two or more.

Incomplete reporting was also possible. Survey instructions requested identification of time periods in which observations were suspended. This was to allow adjustment to the data, i.e., no traffic reported for a period of time

was due to not observing during that time period, not the absence of traffic activity. Although some lapse time in observations was reported, there were many instances where the data suggest (e.g., sharp fluctuations in observations) that a break in observations, which was not reported, had occurred.

## APPENDIX A

## METHODOLOGY

### 1. SURVEY DESIGN

The purpose of the General Aviation Pilot and Aircraft Activity Survey is to increase FAA knowledge of the characteristics of general aviation activity and its impact on the National Airspace System (NAS). Current information on general aviation characteristics such as pilot profiles, flight profiles, airport facilities, use of weather information, fuel consumption, aircraft miles flown and traffic volumes and patterns were collected. The survey was conducted by collecting information on general aviation activities and pilot characteristics from a sample of airports. Trends and changes in general aviation activity were analyzed by comparing the results of this survey with those of previous surveys.

The survey was designed to be conducted in two parts. Part I consisted of interviewing as many general aviation pilots as possible upon their arrival at sample airports. Part II consisted of direct observation of general aviation operations at each of the sample airports.

<u>Part I. Interview of General Aviation Pilots</u>

General aviation pilots were interviewed on arrival at sample airports, even if they previously had been interviewed at another airport. Approximately 6,404 general aviation pilots were approached, and 5,224 pilots agreed to be interviewed. The survey questionnaire contained 23 questions. A copy of the pilot questionnaire is displayed in Appendix B. Pilot interviews were conducted by members of the Civil Air Patrol (CAP). Completed pilot questionnaires were received from 252 of the 420 airports in the survey sample.

Interviewers were requested to keep count of those pilots who refused to take part in the survey, since such information is essential for determining the validity of the survey data. Data from the questionnaires were used to develop the pilot and flight characteristics profiles.

<u>Part II. Traffic Count</u>

There are 5,400 public-use airports in the United States. For practical purposes, the sample size of airports was limited to 420 airports. The sample was a stratified, random sample designed to provide proportional representation by FAA region. Within each region, the airport sample was further stratified by type of airport:

1) Towered;
2) Non-towered, paved and lighted (with at least one paved runway);
3) Non-towered, paved and unlighted (with at least one paved runway); and
4) Non-towered, unpaved.

Out of a total sample of 420 public-use airports, 252 airports participated in this year's survey.

## 2. ESTIMATION FROM THE QUESTIONNAIRE DATA

The cross-tabulations produced from the pilot interview data are descriptive findings. These data represent weighted totals from the pilot questionnaires. The data were weighted according to the total annual hours flown in 1989, as stated by the pilot. For cases where the pilot had not listed hours flown in 1989, the average of the entire sample was used as the weight. The purpose of the weight is to represent more precisely the active general aviation pilot population regardless of activity.

In all cases, the cross-tabulations were produced only from those records which contained responses to all relevant questions. Therefore, each table may be based upon a different set of interviews. Due to this reason and the use of the weighting factor, the tabular results are presented as percentages, rather than frequencies.

## 3. ESTIMATION FROM THE TRAFFIC COUNT DATA

The traffic count data collected at the surveyed airports were used to estimate the total number of general aviation operations which occurred in 1990. An estimate was derived for each of the four airport types and summed over airport types to determine an overall total. This approach grouped together airports which were expected to be homogeneous with respect to their daily traffic volume, since the facilities available at an airport are indicative of the traffic there. For this reason, airports were sampled according to their tower and runway attributes.

For each airport type, an average daily traffic estimate was derived. Daily traffic is defined as the number of takeoffs plus the number of landings. In order to arrive at a daily estimate, it was necessary to make an estimate for each hour between 0600 and 2100 and sum the hourly estimates. This step was necessary because the hours of operation differed from airport to airport, as did the hours of observation. Partial hour observations were accounted for in the estimation procedure. Survey interruption periods were recorded and were also taken into account.

According to patterns identified through data collected on FAA's Air Traffic Reporting System, traffic volumes differ between weekdays and weekend days. Because of this difference, estimations of daily traffic profiles were performed separately for the two cases. The hourly traffic estimates over all airports for weekdays and weekend days are provided in Tables 7.3 and 7.4. An average daily estimate was calculated by weighting the weekday average by five and weighting the weekend average by two and then dividing the total by seven.

The airport type daily traffic estimates were adjusted to account for night traffic occurring between the hours of 2100 and 0600 at lighted airports. The adjustments were expressed as percentages of the traffic estimated for the 0600 to 2100 interval. The adjustment factors provided by the FAA were seven percent and three percent of estimated daily traffic for Type 1, towered airports, and Type 2, non-towered with paved and lighted runways, respectively. Type 3, paved and unlighted airports, and Type 4, unpaved runway airports, were unadjusted

because they are unlighted and do not operate at night. The resulting estimates are presented in Table 7.1.

Since general aviation activity is affected by the climate, a seasonal influence on the level of activity occurs at different times of the year, particularly in regions with more pronounced seasonal weather patterns. The survey data were collected during the summer months; yet an annual estimate is desired. Therefore, the seasonal bias had to be removed before the annual estimate could be made.

Historical data collected at FAA towered airports were used to calculate quarterly seasonal patterns for each FAA region. The factors for the third quarter were applied to the individual airport traffic counts before the estimation was performed, yielding daily averages corrected for potential seasonal bias.

The following methodology was employed to estimate the total number of general aviation operations in 1990:

1. Apply seasonal factors to individual airport counts.

2. For each of the four airport types:

    a. Calculate an hourly average number of operations for each hour between 0600 and 2100, separately for weekdays and weekend days.

    b. Sum the hourly averages to obtain daily averages.

    c. Weight the weekday and weekend day daily average to obtain an overall daily average.

    d. Adjust the daily average to reflect nighttime activities.

    e. Multiply the adjusted daily estimate by 365 and then by the number of airports in each category, to obtain four annual estimates.

3. Sum the four annual estimates.

## 4. RELIABILITY OF THE SURVEY DATA

An assessment of the reliability of survey data is difficult to make under any circumstances. The quality of the data is dependent upon many factors, some of which are within the control of the survey practitioner and others which, at best, can be guarded against in an effort to control their impact.

Errors in survey data are of two types, sampling error and non-sampling error. Sampling error results because only a portion of the population under study has been observed, rather than the entire population. This type of error manifests itself by the fact that each different sample which could potentially result from the sample design could yield a different estimate of the quantity being

estimated. The degree to which these estimates vary over the different samples is referred to as the sampling error.

The magnitude of the sampling error is a function of the sample design and estimation techniques. A well designed sample, which incorporates prior knowledge about the underlying population, can greatly reduce sampling error. In the case of the 1990 survey, there were three underlying populations of interest: the active pilot population, the population of general aviation flights, and the population of general aviation operations. The sample design had to allow for estimation involving all three populations. The discussion presented earlier concerning the sample design describes how this goal was achieved. The final sample design was based upon extensive prior knowledge of the underlying population.

The other type of survey error, non-sampling error, arises from a variety of sources and impacts the estimate via biases which cause the mathematical expected value of the estimator to differ from the true population value. One such source of non-sampling error is non-response. Potential data sources in the sample which do not respond bias the estimates produced from the sample to the extent that they represent a homogeneity (with respect to the characteristic under study) which is different from that represented by the respondents. Non-response bias can, to an extent, be corrected by various methods which involve adjusting for the non-respondents.

In this survey, non-respondents were represented by those pilots who refused to be interviewed. The extent of non-response differed from site to site, but an overall rate of approximately 18 percent was experienced. Due to the nature of the survey, there was no way to follow up these cases and, therefore, no way to adjust for them. Hence, their impact on the results is indeterminable. However, comparisons to other sources of data on the populations (such as the <u>1989 General Aviation Activity and Avionics Survey</u>) suggest that their impact was minimal.

Another type of non-response experienced in the survey was non-response at the airport level. Although 420 airports were selected in the sample, operations were only surveyed at 252 of them. As a result, the geographical and airport type distribution of the sample was distorted. The effect that this has had on the observed characteristics of pilots and flights cannot be determined but, again, the alternate sources suggest that the impact was not serious.

Another type of non-sampling error experienced in the survey was measurement error, for example, unrecorded gaps in observation periods. This type of error results from respondents providing incorrect data. Careful editing of the survey documents was one means of limiting this type of error.

In addition to non-response and measurement error, which occur during the data collection process, other errors may be introduced during the data processing stage. These errors include coding, transcription and data entry errors, as well as judgmental errors in editing the data. Due to the numerous sources of non-sampling errors and the inability to assess the magnitude of the resultant biases, it is generally believed that they are a more serious type of error than the sampling error, which in most cases can be estimated using the data. The most effective means of dealing with non-sampling errors, therefore, is to

anticipate them and thereby attempt to control them via quality control measures. In the data processing phase of the survey operations, a number of quality control measures, such as 100 percent checks of all data entry items, were applied in order to minimize the introduction of non-sampling errors into the survey data.

## SURVEY FORMS

U.S. Department of Transportation
Federal Aviation Administration

Form Approved
OMB No. 2120-0097

# PILOT QUESTIONNAIRE

**General Aviation Pilot and Aircraft Activity Survey**
**Conducted by the Civil Air Patrol**

This survey is authorized by Sections 311 and 312 of the Federal Aviation Act of 1958, as amended. While you are not required to respond, your cooperation is needed to make the results of this survey comprehensive, accurate and timely. Information collected in this survey will be used for statistical purposes only.

Answers to questions #1 and #2 have been completed by the cadet administering the survey. Please verify that the information is correct and begin answering question #3. Should you have any difficulty in interpreting a question, please do not hesitate to ask the cadet administering the survey for assistance.

## 1. AIRPORT INFORMATION

a. Airport Name: ____________________

b. Airport Code *(FAA use only)* : ____________________

c. Location *(Closest city)* : ____________________

d. County: ____________________ e. State: ____________________

f. Airport Tower: (1) ______ Tower (2) ______ No Tower

g. Runway(s): a. (1) ______ Paved (2) ______ Unpaved

b. (1) ______ Lights Available (2) ______ No Lights Available

## 2. SURVEY DATE

a. Day of Week: ____________________

b. Month Day Year: ____________________

*(Mo.)* *(Day)* *(Yr.)*

Return to: Federal Aviation Administration
Attention: ERA
Caller No. 91013
Arlington, Virginia 22202

# INFORMATION ON FLIGHT JUST COMPLETED

**3. WHAT TYPE OF AIRCRAFT DID YOU USE IN THIS FLIGHT?** ***(Check only one.)***

a. ☐ Single Engine Piston
b. ☐ Multiengine Piston
c. ☐ Rotorcraft Piston
d. ☐ Rotorcraft Turbine
e. ☐ Turboprop
f. ☐ Turbojet
g. ☐ Glider
h. ☐ Balloon

**4. HOW DID YOU OBTAIN THE AIRCRAFT FOR THIS FLIGHT?** ***(Check only one.)***

a. ☐ Individual Owner or Partnership
b. ☐ Commercial Rental/Flying Club/Leased
c. ☐ Corporate Owner Other Than Commercial
d. ☐ Government
e. ☐ Other

**5. HOW MANY SEATS ARE AVAILABLE FOR BOTH PASSENGERS AND CREW** ***(including pilot)*** **IN THIS AIRCRAFT?** Number of Seats ____

**6. HOW MANY SEATS WERE OCCUPIED DURING THIS FLIGHT?** Number of Seats ____

**7. WHAT WAS THE MAIN PURPOSE OF THIS FLIGHT?** ***(Check only one. See definitions on back cover.)***

a. ☐ Personal/Recreation
b. ☐ Business
c. ☐ Executive/Corporate
d. ☐ Commuter Air Carrier
e. ☐ Air Taxi *(Excluding Commuter Air Carrier)*
f. ☐ Instructional *(Excluding Proficiency)*
g. ☐ Aerial Application
h. ☐ Industrial/Special *(Patrol/Survey, Etc.)*
i. ☐ Other *( Demonstration, R&D, Parachuting, etc.)*

**8. a. DID YOU OBTAIN WEATHER INFORMATION** ***PRIOR*** **TO THIS FLIGHT?**

1. ☐ YES
2. ☐ NO *(If no, please go to question 9.)*

**b. HOW DID YOU OBTAIN THE INFORMATION?** ***(Check all that apply.)***

1. ☐ FSS Briefing
2. ☐ NWS Briefing
3. ☐ VRS Briefing
4. ☐ TV/Radio/Newspaper
5. ☐ PATWAS/Tele TWEB
6. ☐ TWEB Broadcast
7. ☐ DUAT via PC
8. ☐ NOAA Broadcast
9. ☐ ATIS Broadcast
10. ☐ Other Sources

**9. a. DID YOU OBTAIN WEATHER INFORMATION** ***DURING*** **THIS FLIGHT?**

1. ☐ YES
2. ☐ NO *(If no, please go to question 10.)*

**b. HOW DID YOU OBTAIN THE INFORMATION?** ***(Check all that apply.)***

1. ☐ Contacted EFAS (FLIGHT WATCH)
2. ☐ Monitored FLIGHT WATCH
3. ☐ Contacted FSS Other Than FLIGHT WATCH
4. ☐ Contacted Center/Tower
5. ☐ ATIS Broadcast
6. ☐ FSS Hourly Broadcast
7. ☐ TWEB–NDB Broadcast
8. ☐ TWEB–VOR Broadcast
9. ☐ Other

**10. a. DID YOU FILE A FLIGHT PLAN FOR THIS FLIGHT?**

1. ☐ YES
2. ☐ NO *(If no, please go to question 11.)*

**b. WHAT TYPE OF FLIGHT PLAN DID YOU FILE?** ***(Check only one.)***

1. ☐ Preflight IFR
2. ☐ Preflight VFR
3. ☐ Inflight IFR
4. ☐ Inflight VFR
5. ☐ Composite

**c. HOW DID YOU FILE THE FLIGHT PLAN?** ***(Check only one.)***

1. ☐ FSS Tape-Recorder (Fast File)
2. ☐ FSS Specialist
3. ☐ DUAT via PC
4. ☐ Center/Tower Controller

**11. WAS THIS FLIGHT LOCAL** ***(entire flight within 20 miles of this airport)*** **OR CROSS-COUNTRY?**

a. ☐ Local *(If local, please go to question 12.)*
b. ☐ Cross-country *(If cross-country, please go to question 13.)*

**12. IF THIS WAS A LOCAL FLIGHT** ***(Answer all)*** **:**

a. How many landings, including touch-and-go's, did you make? (Number of Landings) ____
b. What was the total flight time? (Hours:Minutes) ____
c. What was the average air speed? (Knots) ____

*(Please go to question 14.)*

13. **IF THIS WAS A CROSS-COUNTRY FLIGHT** ***(Answer all):***

a. What was your total enroute distance between the last departure and arrival airports? (Nautical Miles) ☐

b. What was the flight time between the last departure and arrival airports? (Hours:Minutes) ☐

c. The last airport you came from was *(Check only one):*

1. ☐ Towered 2. ☐ Non-towered, Paved Runway 3. ☐ Non-towered, Unpaved Runway

d. Including all intermediate stops, what was your total enroute distance between origin and destination airports? (Nautical Miles) ☐

e. What was the maximum enroute altitude during this flight? (MSL) ☐

## GENERAL AVIATION INFORMATION

14. **WHAT IS THE AVERAGE FUEL CONSUMPTION FOR THIS AIRCRAFT AT NORMAL CRUISE SPEED?** *(Gallons per Hour)* ☐

15. a. **IS THIS AIRCRAFT EQUIPPED WITH MODE C?**

1. ☐ YES 2. ☐ NO *(If no, please go to question 16.)*

b. **IF THIS AIRCRAFT IS EQUIPPED WITH MODE C** ***(Answer all)*:**

1. Does Mode C assist you in navigating the National Aerospace System (NAS)? aa. ☐ YES bb. ☐ NO

2. Do you experience any problems with Mode C? *(If YES, please briefly explain problems in the space provided.)* aa. ☐ YES bb. ☐ NO

3. If you have any recommendations or comments about Mode C, please mention them in the space provided.

16. **DO YOU HOLD A CURRENT INSTRUMENT RATING?** a. ☐ YES b. ☐ NO

17. **WHAT PILOT CERTIFICATE DO YOU CURRENTLY HOLD?** ***(Check the highest.)***

a. ☐ Student c. ☐ Private e. ☐ Airline Transport
b. ☐ Recreation d. ☐ Commercial f. ☐ Foreign

18. **WHAT ARE THE TOTAL NUMBER OF HOURS (LIFETIME) YOU HAVE FLOWN AS A PILOT?** (Hours) ☐

19. **WHAT IS YOUR AGE GROUP?** ***(Check only one.)***

a. ☐ Less than 16 c. ☐ 20-24 e. ☐ 30-34 g. ☐ 40-44 i. ☐ 50-54 k. ☐ 60 or over
b. ☐ 16-19 d. ☐ 25-29 f. ☐ 35-39 h. ☐ 45-49 j. ☐ 55-59

20. a. **DID YOU FLY IN 1989?** 1. ☐ YES 2. ☐ NO *(If NO, please go to question 21.)*

b. **OF YOUR TOTAL FLYING TIME IN 1989** ***(Answer both)*:**

1. How many hours were local flying? (Hours) ☐
2. How many hours were cross-country flying? (Hours) ☐

21. **WERE YOU PREVIOUSLY ASKED TO COMPLETE THIS QUESTIONNAIRE AT THIS OR ANOTHER AIRPORT?** a. ☐ YES b. ☐ NO

22. **HOW WELL DOES THIS AIRPORT MEET YOUR REQUIREMENTS?** ***(Check all that apply.)***

| | Very Well | Adequately | Poorly |
|---|---|---|---|
| a. Airport Location | ☐ | ☐ | ☐ |
| b. Approach Zone Condition | ☐ | ☐ | ☐ |
| c. Runway Length | ☐ | ☐ | ☐ |
| d. Runway Condition | ☐ | ☐ | ☐ |
| e. Runway Lighting *(if runway is lighted)* | ☐ | ☐ | ☐ |
| f. FBO Service *(if there is FBO service)* | ☐ | ☐ | ☐ |

23. **DO YOU PREFER THAT THE DESTINATION AIRPORT IN YOUR CROSS-COUNTRY FLIGHT HAVE THE FOLLOWING FACILITIES?** ***(Check all that apply.)***

| | Yes | Don't Care | No |
|---|---|---|---|
| a. A Control Tower | ☐ | ☐ | ☐ |
| b. Runway Over 5,000 Feet | ☐ | ☐ | ☐ |
| c. Runway Lighting | ☐ | ☐ | ☐ |
| d. VOR/DME Approach | ☐ | ☐ | ☐ |
| e. ILS/MLS Approach | ☐ | ☐ | ☐ |
| f. FBO Service | ☐ | ☐ | ☐ |

## PURPOSE OF FLIGHT DEFINITIONS FOR QUESTION 7

a. **PERSONAL/RECREATION**—Any use of an aircraft for personal or recreational purposes **NOT** associated with business or profession, and not for hire. ***This includes maintenance of pilot proficiency.***

b. **BUSINESS**—Any use of an aircraft, not for compensation or hire, by an individual for the purposes of transporation required by a business in which he or she is engaged.

c. **EXECUTIVE/CORPORATE**—Any use of an aircraft by a corporation, company or other organization for the purposes of transporting its employees and/or property not for compensation or hire and employing professional pilots for the operation of the aircraft. ***This includes maintenance of proficiency of the pilots employed by the company.***

d. **COMMUTER AIR CARRIER**—Any air taxi that performs at least five scheduled round trips per week between two or more points, or who carries mail. ***This includes maintenance of pilot proficiency.***

e. **AIR TAXI**—Use of an aircraft operating under Federal Aviation Regulations Part 135, passenger and cargo operations, including charter and excluding commuter air carrier. ***This includes maintenance of pilot proficiency.***

f. **INSTRUCTIONAL**—Any use of an aircraft for the purposes of formal flight instruction with or without the flight instructor aboard. ***This excludes proficiency flying.***

g. **AERIAL APPLICATION**—Any use of an aircraft for work purposes which concerns the production of foods, fibers, and health control in which the aircraft is used in lieu of farm implements or ground vehicles for the particular task accomplished. This includes fire fighting operations, the distribution of chemicals or seed in agriculture, reforestation, or insect control.

h. **INDUSTRIAL/SPECIAL**—Any use of an aircraft for specialized work allied with industrial activities. Examples include: pipeline patrol, survey, aerial advertising, fish spotting, aerial mapping/photography, helicopter hoist, towing gliders, search and rescue, hunting, highway traffic advisory, sightseeing, etc. ***This excludes transportation and aerial application.***

i. **OTHER**—Any use of an aircraft not included above. Examples include: research and development, experimentation, R&D, testing, government demonstrations, air shows, air racing, parachuting, sport, etc.

**THANK YOU FOR PARTICIPATING IN THIS SURVEY.**

U.S. Department of Transportation
Federal Aviation Administration

# TRAFFIC COUNT FORM

## General Aviation Pilot and Aircraft Activity Survey
## Conducted by the Civil Air Patrol

### 1. AIRPORT INFORMATION

a. Airport Name: ____________________

b. Airport Code *(FAA use only)* : ____________________

c. Location *(Closest city)* : __________ d. County: __________ e. State: __________

f. Airport Tower: (1) ______ Tower (2) ______ No Tower

g. Runway(s): a. (1) ______ Paved (2) ______ Unpaved

b. (1) ______ Lights Available (2) ______ No Lights Available

### 2. SURVEY DATE

a. Day of Week: ____________________ b. Date: __________ __________ __________
*(Mo.)* *(Day)* *(Yr.)*

### 3. TIME PERIOD(S) OF SURVEY INTERRUPTION(S): ____________________

| 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|
| Time (local) [a] | Aircraft Type[b] | Take-Off | Land-ing | Touch/Go | VFR | IFR |
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| 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|
| Time (local) [a] | Aircraft Type[b] | Take-Off | Land-ing | Touch/Go | VFR | IFR |
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[a] Use 24 Hour Clock an[illegible]rd Time to the Nearest Minute: e.g., 2:13 p.m. = 14:13.

[b] 1 = Single Engine Piston, 1-3 Seats
2 = Single Engine Piston, 4+ Seats
3 = Multiengine Piston
4 = Turboprop
5 = Turbojet
6 = Rotorcraft
7 = Glider
8 = Balloon

FAA FORM 1800-OT-a (1-90)

## APPENDIX C

## LIST OF PARTICIPATING CAP SQUADRONS

**ALABAMA**

BESSEMER COMPOSITE SQUADRON
PELHAM, ALABAMA

HUNTSVILLE COMPOSITE SQUADRON
HUNTSVILLE, ALABAMA

SELMA COMPOSITE SQUADRON
SELMA, ALABAMA

**ALASKA**

BIRCHWOOD COMPOSITE SQUADRON
CHUGIAK, ALASKA

JUNEAU SOUTHEAST COMPOSITE SQUADRON
JUNEAU, ALASKA

SITKA BARANOF COMPOSITE SQUADRON
SITKA, ALASKA

**ARIZONA**

CHANDLER SENIOR SQUADRON 401
CHANDLER, ARIZONA

FALCON COMPOSITE SQUADRON 305
SUN LAKES, ARIZONA

GOODYEAR COMPOSITE SQUADRON 313
GLENDALE, ARIZONA

LONDON BRIDGE COMPOSITE SQUADRON 204
LAKE HAVASU, ARIZONA

**ARKANSAS**

HOT SPRINGS COMPOSITE SQUADRON
HOT SPRINGS, ARKANSAS

LITTLE ROCK COMPOSITE SQUADRON
LITTLE ROCK, ARKANSAS

**ARKANSAS (CONTINUED)**

MONTICELLO COMPOSITE SQUADRON
MONTICELLO, ARKANSAS

TEXARKANA SENIOR SQUADRON
TEXARKANA, ARKANSAS

TWIN LAKES COMPOSITE SQUADRON
MOUNTAIN HOME, ARKANSAS

**CALIFORNIA**

BISHOP COMPOSITE SQUADRON 66
BISHOP, CALIFORNIA

BROWN FIELD CADET SQUADRON 67
CHULA VISTA, CALIFORNIA

EASTERN SIERRA GROUP 9
LANCASTER, CALIFORNIA

EL CAJON CADET SQUADRON 55
EL CAJON, CALIFORNIA

EUREKA COMPOSITE SQUADRON 34
EUREKA, CALIFORNIA

FRANCIS G. POWERS SENIOR SQUADRON 39
LANCASTER, CALIFORNIA

FRESNO COMPOSITE SQUADRON 112
FRESNO, CALIFORNIA

GOLDEN EAGLES CADET SQUADRON 77
SAN DIEGO, CALIFORNIA

JON E. KRAMER COMPOSITE SQUADRON 10
MOUNTAIN VIEW, CALIFORNIA

LONG BEACH COMPOSITE SQUADRON 93
LONG BEACH, CALIFORNIA

LOS ALAMITOS CADET SQUADRON 153
STANTON, CALIFORNIA

## CALIFORNIA (CONTINUED)

MARIN COMPOSITE AIR RESERVE
SQUADRON 4
SAN RAFAEL, CALIFORNIA

NORTON AFB COMPOSITE SQUADRON 31
NORTON AFB, CALIFORNIA

OROVILLE COMPOSITE SQUADRON 141
OROVILLE, CALIFORNIA

RAMONA CADET SQUADRON 82
POWAY, CALIFORNIA

RICHARD W. ROGERS COMPOSITE
SQUADRON 9
MADERA, CALIFORNIA

SANTA ROSA COMPOSITE SQUADRON 115
SANTA ROSA, CALIFORNIA

SHASTA COMPOSITE SQUADRON 126
REDDING, CALIFORNIA

VANDENBERG COMPOSITE SQUADRON 101
VANDENBERG AFB, CALIFORNIA

WEST BAY COMPOSITE SQUADRON 192
BELMONT, CALIFORNIA

## COLORADO

COLORADO WING HEADQUARTERS SQUADRON
LOWRY AFB, COLORADO

THOMPSON VALLEY COMPOSITE SQUADRON
FT. COLLINS, COLORADO

## DELAWARE

BRANDYWINE CADET SQUADRON
CLAYMONT, DELAWARE

SMYRNA CADET SQUADRON
SYMRNA, DELAWARE

SUSSEX CADET SQUADRON
SEAFORD, DELAWARE

## FLORIDA

CEDAR KEY SENIOR SQUADRON
CEDAR KEY, FLORIDA

FLORIDA WING HEADQUARTERS SQUADRON
ORLANDO, FLORIDA

HEADQUARTERS GROUP 5
LANTANA, FLORIDA

LAKELAND SENIOR SQUADRON
LAKELAND, FLORIDA

MARCO ISLAND SENIOR SQUADRON
MARCO ISLAND, FLORIDA

NEW SMYRNA BEACH COMPOSITE SQUADRON
NEW SMYRNA BEACH, FLORIDA

PENSACOLA COMPOSITE SQUADRON
PENSACOLA, FLORIDA

SARASOTA-BRADENTON COMPOSITE SQUADRON
BRADENTON, FLORIDA

SOUTH BREVARD COMPOSITE SQUADRON
PALM BAY, FLORIDA

## GEORGIA

ATHENS COMPOSITE SQUADRON
ATHENS, GEORGIA

CALLAWAY CADET SQUADRON
LAGRANGE, GEORGIA

COLUMBUS COMPOSITE SQUADRON
CUSSETA, GEORGIA

DEKALB COUNTY CADET SQUADRON
ATLANTA, GEORGIA

## HAWAII

KONA COMPOSITE SQUADRON
KAILUA-KONA, HAWAII

**IDAHO**

CANYON COUNTY COMPOSITE SQUADRON
NAMPA, IDAHO

POCATELLO COMPOSITE SQUADRON
POCATELLO, IDAHO

**ILLINOIS**

CAPITAL AIRPORT SQUADRON
SPRINGFIELD, ILLINOIS

DECATUR COMPOSITE SQUADRON
DECATUR, ILLINOIS

DEKALB AREA COMPOSITE SQUADRON
DEKALB, ILLINOIS

EFFINGHAM COMPOSITE SQUADRON
EFFINGHAM, ILLINOIS

JACKSON COUNTY COMPOSITE SQUADRON
CARBONDALE, ILLINOIS

MCCLEAN COUNTY COMPOSITE SQUADRON
BLOOMINGTON, ILLINOIS

RANTOUL CHANUTE COMPOSITE SQUADRON
CHANUTE AFB, ILLINOIS

SANDWICH CADET FLIGHT SQUADRON
SANDWICH, ILLINOIS

**INDIANA**

GRANT COUNTY SENIOR SQUADRON
JONESBORO, INDIANA

MARION CADET SQUADRON
MARION, INDIANA

SOUTH BEND COMPOSITE SQUADRON
GRANGER, INDIANA

VINCENNES CADET SQUADRON
LOOGOOTEE, INDIANA

**IOWA**

BURLINGTON COMPOSITE SQUADRON
BURLINGTON, IOWA

ESTHERVILLE COMPOSITE SQUADRON
ESTHERVILLE, IOWA

IOWA WING STAFF
DES MOINES, IOWA

NORTH IOWA COMPOSITE SQUADRON
CLEAR LAKE, IOWA

WAVERLY COMPOSITE SQUADRON
WAVERLY, IOWA

**KANSAS**

HUTCHINSON COMPOSITE FLIGHT 1400
HUTCHINSON, KANSAS

JUNCTION CITY COMPOSITE SQUADRON
JUNCTION CITY, KANSAS

SALINA COMPOSITE SQUADRON 14092
SALINA, KANSAS

WICHITA FIRST COMPOSITE SQUADRON
WICHITA, KANSAS

**KENTUCKY**

BOWLING GREEN-WARREN COUNTY COMPOSITE SQUADRON
BOWLING GREEN, KENTUCKY

CENTENARY COMPOSITE SQUADRON
LEXINGTON, KENTUCKY

LEXINGTON SENIOR SQUADRON
LEXINGTON, KENTUCKY

LONDON COMPOSITE SQUADRON
LONDON, KENTUCKY

PADUCAH COMPOSITE SQUADRON
PADUCAH, KENTUCKY

## LOUISIANA

ALEXANDRIA SENIOR SQUADRON
ALEXANDRIA, LOUISIANA

ACADIA COMPOSITE SENIOR SQUADRON
CROWLEY, LOUISIANA

LAFAYETTE COMPOSITE SQUADRON
LAFAYETTE, LOUISIANA

LAKE CHARLES COMPOSITE SQUADRON
LAKE CHARLES, LOUISIANA

ST. MARY PARISH COMPOSITE SQUADRON
MORGAN CITY, LOUISIANA

SHREVEPORT SENIOR SQUADRON
SHREVEPORT, LOUISIANA

## MAINE

BANGOR-BREWER COMPOSITE SQUADRON
LEVANT, MAINE

CARIBOU COMPOSITE SQUADRON
PRESQUE ISLE, MAINE

CUMBERLAND COUNTY COMPOSITE SQUADRON
PORTLAND, MAINE

DOWNEAST PATROL COMPOSITE SQUADRON
ELLSWORTH, MAINE

## MARYLAND

APOLLO I COMPOSITE SQUADRON
SEVERN, MARYLAND

CARROLL COMPOSITE SQUADRON
MONKTON, MARYLAND

EASTON COMPOSITE SQUADRON
EASTON, MARYLAND

HAGERSTOWN COMPOSITE SQUADRON
HAGERSTOWN, MARYLAND

## MARYLAND (CONTINUED)

NEW CASTLE CADET SQUADRON
ELKTON, MARYLAND

ST. MARY'S COMPOSITE SQUADRON
GREAT MILLS, MARYLAND

WHITE MARSH COMPOSITE SQUADRON
BALTIMORE, MARYLAND

WICOMICO COMPOSITE SQUADRON
BERLIN, MARYLAND

## MASSACHUSETTS

CAPE COD COMPOSITE SQUADRON
BUZZARDS BAY, MASSACHUSETTS

HANSCOM COMPOSITE SQUADRON
WESTON, MASSACHUSETTS

MT. WACHUSETT COMPOSITE SQUADRON
LUNERBURG, MASSACHUSETTS

PHOENIX BAY PATH COMPOSITE SQUADRON
FISKDALE, MASSACHUSETTS

WORCESTER CADET SQUADRON
AUBURN, MASSACHUSETTS

## MICHIGAN

ENTERPRISE GROUP IV
ROMULUS, MICHIGAN

MACOMB GROUP III
ANCHORVILLE, MICHIGAN

NORTH CENTRAL GROUP VI
TAWAS CITY, MICHIGAN

ROGER B. CHAFFEE MEMORIAL GROUP VIII
GRAND RAPIDS, MICHIGAN

SAGINAW VALLEY GROUP I
FLINT, MICHIGAN

**MINNESOTA**

CROW WING COMPOSITE SQUADRON
BRAINERD, MINNESOTA

HUTCHINSON SENIOR SQUADRON
GLENCOE, MINNESOTA

NORTH HENNEPIN SQUADRON
COON RAPIDS, MINNESOTA

RUM RIVER FLIGHT
ISANTI, MINNESOTA

**MISSISSIPPI**

JACKSON CADET SQUADRON
JACKSON, MISSISSIPPI

NORTH MISSISSIPPI COMPOSITE SQUADRON
SOUTHAVEN, MISSISSIPPI

WASHINGTON COUNTY COMPOSITE SQUADRON
GREENVILLE, MISSISSIPPI

**MISSOURI**

CAPITAL CITY COMPOSITE SQUADRON
JEFFERSON CITY, MISSOURI

NORTH MISSOURI COMPOSITE SQUADRON
KIRKSVILLE, MISSOURI

SEDALIA CADET SQUADRON
SEDALIA, MISSOURI

SPRINGFIELD COMPOSITE SQUADRON
SPRINGFIELD, MISSOURI

**MONTANA**

BILLINGS COMPOSITE SQUADRON
BILLINGS, MONTANA

**NEBRASKA**

FREMONT CADET SQUADRON
FREMONT, NEBRASKA

**NEBRASKA (CONTINUED)**

SANDHILLS COMPOSITE SQUADRON
AINSWORTH, NEBRASKA

YORK COMPOSITE SQUADRON
YORK, NEBRASKA

**NEVADA**

CLARK COUNTY COMPOSITE SQUADRON
NORTH LAS VEGAS, NEVADA

**NEW HAMPSHIRE**

COBRA CADET SQUADRON
CLAREMONT, NEW HAMPSHIRE

HAWK COMPOSITE SQUADRON
SILVER LAKE, NEW HAMPSHIRE

**NEW JERSEY**

CUMBERLAND COMPOSITE SQUADRON
ELMER, NEW JERSEY

OCEAN COMPOSITE SQUADRON
LAVALLETT, NEW JERSEY

SALEM COUNTY COMPOSITE SQUADRON
ELMER, NEW JERSEY

**NEW MEXICO**

BLACK SHEEP COMPOSITE SQUADRON
ALBUQUERQUE, NEW MEXICO

FALCON COMPOSITE SQUADRON
RIO RANCHO, NEW MEXICO

HIGH PLAINS COMPOSITE SQUADRON
CLOVIS, NEW MEXICO

LAS CRUCES COMPOSITE SQUADRON
LAS CRUCES, NEW MEXICO

PECOS VALLEY SENIOR SQUADRON
ROSWELL, NEW MEXICO

## NEW YORK

ALLEGANY COUNTY COMPOSITE SQUADRON
WELLSVILLE, NEW YORK

CHEMUNG COUNTY COMPOSITE SQUADRON
ELMIRA, NEW YORK

ITHACA COMPOSITE SQUADRON
TRUMANSBURG, NEW YORK

NEW YORK STATE CAPITAL GROUP
SLINGERLANDS, NEW YORK

ORANGE COUNTY GROUP
WEST HURLEY, NEW YORK

ROME-UTICA GROUP
WHITESBORO, NEW YORK

SOUTHERN TIER GROUP
ERIN, NEW YORK

SYRACUSE GROUP
CANASTOTA, NEW YORK

## NORTH CAROLINA

141ST. SAR COMPOSITE SQUADRON
RAMSEUR, NORTH CAROLINA

ASHEVILLE COMPOSITE SQUADRON
ASHEVILLE, NORTH CAROLINA

CABARRUS COMPOSITE SQUADRON
CHARLOTTE, NORTH CAROLINA

CENTRAL COMPOSITE SQUADRON
SANFORD, NORTH CAROLINA

JOHNSTON COUNTY COMPOSITE SQUADRON
GARNER, NORTH CAROLINA

KINSTON COMPOSITE SQUADRON
KINSTON, NORTH CAROLINA

RANDOLPH COMPOSITE SQUADRON
ASHEBORO, NORTH CAROLINA

## NORTH DAKOTA

MAGIC CITY COMPOSITE SQUADRON
MINOT, NORTH DAKOTA

## OHIO

AKRON-CANTON COMPOSITE SQUADRON
UNIONTOWN, OHIO

DAYTON AERO CADET SQUADRON
TIPP CITY, OHIO

GROUP II
MEDINA, OHIO

GROUP III
GIRARD, OHIO

GROUP V
ZANESVILLE, OHIO

GROUP VI
TOLEDO, OHIO

HEADQUARTERS GROUP XII
PARMA, OHIO

## OKLAHOMA

ARDMORE COMPOSITE SQUADRON
ARDMORE, OKLAHOMA

CLEVELAND COUNTY COMPOSITE SQUADRON
NORMAN, OKLAHOMA

ENID COMPOSITE SQUADRON
ENID, OKLAHOMA

OKLAHOMA CITY COMPOSITE SQUADRON # 1
OKLAHOMA CITY, OKLAHOMA

OKLAHOMA CITY COMPOSITE SQUADRON # 2
OKLAHOMA CITY, OKLAHOMA

THOMAS P. STAFFORD COMPOSITE SQUADRON
THOMAS, OKLAHOMA

## OREGON

GROUP I
HILLSBORO, OREGON

HOOD RIVER SENIOR SQUADRON
HOOD RIVER, OREGON

MAHLON SWEET COMPOSITE SQUADRON
EUGENE, OREGON

## PENNSYLVANIA

GOLDEN TRIANGLE COMPOSITE SQUADRON 603
PITTSBURGH, PENNSYLVANIA

JOHNSTOWN COMPOSITE SQUADRON
JOHNSTOWN, PENNSYLVANIA

KEYSTONE COUNTY CADET SQUADRON
ALTOONA, PENNSYLVANIA

MAJOR DON BEATTY COMPOSITE SQUADRON 501
COOPERSTOWN, PENNSYLVANIA

PENN STATE UNIVERSITY COMPOSITE SQUADRON 1303
WARRIOR MARKS, PENNSYLVANIA

POCONO MOUNTAIN COMPOSITE SQUADRON 806
POCONO SUMMIT, PENNSYLVANIA

## PUERTO RICO

GROUP 1 PUERTO RICO WING
TRUJILLO ALTO, PUERTO RICO

GROUP 4 PUERTO RICO WING
PONCE, PUERTO RICO

JUANA DIAZ HIGH SCHOOL CADET SQUADRON
PONCE, PUERTO RICO

PONCE HIGH SCHOOL CADET SQUADRON
PONCE, PUERTO RICO

## PUERTO RICO (CONTINUED)

YAUCO HIGH SCHOOL CADET SQUADRON
PONCE, PUERTO RICO

## RHODE ISLAND

102ND COMPOSITE SQUADRON
SLATERSVILLE, RHODE ISLAND

WEST BAY COMPOSITE SQUADRON
WEST WARWICK, RHODE ISLAND

## SOUTH CAROLINA

DARLINGTON COMPOSITE SQUADRON
HARTSVILLE, SOUTH CAROLINA

FLORENCE COMPOSITE SQUADRON
FLORENCE, SOUTH CAROLINA

LEXINGTON COMPOSITE SQUADRON
COLUMBIA, SOUTH CAROLINA

## SOUTH DAKOTA

BROOKINGS COMPOSITE SQUADRON
BROOKINGS, SOUTH DAKOTA

JOE FOSS SENIOR SQUADRON
SIOUX FALLS, SOUTH DAKOTA

RUSHMORE COMPOSITE SQUADRON
RAPID CITY, SOUTH DAKOTA

## TENNESSEE

BERRY FIELD COMPOSITE SQUADRON
MT. JULIET, TENNESSEE

CLEVELAND COMPOSITE SQUADRON
CLEVELAND, TENNESSEE

HEADQUARTERS GROUP III
HENDERSONVILLE, TENNESSEE

HAMILTON COUNTY COMPOSITE SQUADRON
CHATTANOOGA, TENNESSEE

**TENNESSEE (CONTINUED)**

JOHNSON CITY COMPOSITE SQUADRON
JOHNSON CITY, TENNESSEE

LEBANON COMPOSITE SQUADRON
LEBANON, TENNESSEE

OLD HICKORY COMPOSITE SQUADRON
OLD HICKORY, TENNESSEE

WILLIAMSON COUNTY COMPOSITE SQUADRON
ANTIOCH, TENNESSEE

**TEXAS**

HQ GROUP 4
DALLAS, TEXAS

HQ GROUP 6
FT. WORTH, TEXAS

HQ GROUP 7
TYLER, TEXAS

HQ GROUP 8
AUSTIN, TEXAS

HQ GROUP 9 RIO GRANDE VALLEY
BROWNSVILLE, TEXAS

HQ GROUP 13
HOUSTON, TEXAS

HQ GROUP 17
ABILENE, TEXAS

HQ GROUP 19
SAN ANTONIO, TEXAS

LUBBOCK COUNTY COMPOSITE SQUADRON
LUBBOCK, TEXAS

TIGERSHARK COMPOSITE SQUADRON
AMARILLO, TEXAS

**UTAH**

CASTLE VALLEY COMPOSITE SQUADRON
HUNTINGTON, UTAH

**UTAH (CONTINUED)**

OGDEN SENIOR SQUADRON
OGDEN, UTAH

ST. GEORGE COMPOSITE SQUADRON
ST. GEORGE, UTAH

SEVIER VALLEY SENIOR SQUADRON
RICHFIELD, UTAH

WASATCH SENIOR SQUADRON
SALT LAKE CITY, UTAH

**VERMONT**

BURLINGTON COMPOSITE SQUADRON
SOUTH BURLINGTON, VERMONT

RUTLAND COMPOSITE SQUADRON
NORTH CLARENDON, VERMONT

**VIRGINIA**

BYRD FIELD CADET SQUADRON
SANDSTON, VIRGINIA

FREDRICKSBURG COMPOSITE SQUADRON
FREDRICKSBURG, VIRGINIA

HATHCOCK SENIOR SQUADRON
CHESAPEAKE, VIRGINIA

MILLER SCHOOL CADET SQUADRON
CHARLOTTESVILLE, VIRGINIA

NORFOLK COMPOSITE SQUADRON
NORFOLK, VIRGINIA

SHENANDOAH SENIOR SQUADRON
HARRISONBURG, VIRGINIA

WEST RICHMOND CADET SQUADRON
RICHMOND, VIRGINIA

**WASHINGTON**

ED HAUTER COMPOSITE SQUADRON
EVERETT, WASHINGTON

WASHINGTON (CONTINUED)

FIRE MOUNTAIN COMPOSITE SQUADRON
WINLOCK, WASHINGTON

FT. VANCOUVER COMPOSITE SQUADRON
VANCOUVER, WASHINGTON

OLYMPIA COMPOSITE SQUADRON
LACEY, WASHINGTON

SKY VALLEY COMPOSITE SQUADRON
MONROE, WASHINGTON

TRI-CITIES COMPOSITE SQUADRON
RICHLAND, WASHINGTON

TWIN W COMPOSITE SQUADRON
WALLA WALLA, WASHINGTON

WENATCHEE COMPOSITE SQUADRON
WENATCHEE, WASHINGTON

WEST VIRGINIA

CHARLESTON CADET SQUADRON
DUNBAR, WEST VIRGINIA

MARTINSBURG COMPOSITE SQUADRON
MARTINSBURG, WEST VIRGINIA

NICHOLAS COMPOSITE SQUADRON
RICHWOOD, WEST VIRGINIA

PARKERSBURG COMPOSITE SQUADRON
PARKERSBURG, WEST VIRGINIA

WISCONSIN

EAU CLAIRE COMPOSITE SQUADRON
EAU CLAIRE, WISCONSIN

FOX CITIES COMPOSITE SQUADRON
NEENAH, WISCONSIN

GROUP IX
MARINETTE, WISCONSIN

RACINE COMPOSITE SQUADRON
RACINE, WISCONSIN

WISCONSIN (CONTINUED)

RIVER VALLEY CADET FLIGHT SQUADRON
LONE ROCK, WISCONSIN

ROCK COUNTY COMPOSITE SQUADRON
JANESVILLE, WISCONSIN

WILD RIVER COMPOSITE SQUADRON
HAYWARD, WISCONSIN

WYOMING

POWDER RIVER COMPOSITE SQUADRON
GILLETTE, WYOMING

ROCK SPRINGS COMPOSITE SQUADRON
ROCK SPRINGS, WYOMING

## APPENDIX D

## COMMON ACRONYMS AND GLOSSARY

### COMMON ACRONYMS

AMS 420--Office of Management Standards, Statistical Analysis Branch.

ATIS--Airport Terminal Information Service.

ATP--Air Transport Pilot.

CAP--Civil Air Patrol.

DME--Distance Measuring Equipment.

EFAS--Enroute Flight Advisory Service.

ERA--Executive Resource Associates, Inc..

FAA--Federal Aviation Administration.

FBO--Fixed Base Operator.

FSS--Flight Service Station.

IFR--Instrument Flight Rules.

ILS--Instrument Landing System.

MLS--Microwave Landing System.

NAS--National Aerospace System.

NDB--Non-Directional Beacon.

NOAA--National Oceanographic and Atmospheric Administration.

NWS--National Weather Service.

PATWAS--Pilots Automatic Telephone Weather Answering Service.

TWEB--Transcribed Weather Broadcast

VFR--Visual Flight Rules.

VHF--Very High Frequency.

VOR--Very high frequency Omnidirectional Radio range.

VRS--Voice Response System.

## GLOSSARY

Active Aircraft--All legally registered civil aircraft which flew one or more hours in the year.

Aerial Application--See Primary Use.

Air Taxi--See Primary Use.

Aircraft Type--Grouping of aircraft by basic configuration: single engine piston, 1-3 seats and 4 seats and more; multi-engine piston; rotorcraft piston; rotorcraft turbine; turboprop; turbojet; glider; and other.

Business Transportation--See Primary Use.

Commuter Air Carrier--See Primary Use.

Distance Measuring Equipment (DME)--Airborne and ground equipment used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.

Executive/Corporate Transportation--See Primary Use.

General Aviation--That portion of civil aviation which encompasses all facets of aviation except air carriers.

Industrial/Special--See Primary Use.

Instructional Flying--See Primary Use.

Instrument Flight Rules (IFR)--Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

Instrument Landing System (ILS)--A precision instrument approach system which normally consists of a localizer, glide slope and marker beacon.

Microwave Landing System (MLS)--An instrument landing system operating in the microwave spectrum which provides lateral and vertical guidance to aircraft having compatible avionics equipment.

Mode C--A type of transponder.

Other Flying--See Primary Use.

Personal/Recreation Flying--See Primary Use.

Primary Use--The use category in which an aircraft flew the most hours. The nine use categories used in this report are defined below as:

- Personal/Recreation--Any use of an aircraft for personal or recreational purposes not associated with business or profession, and not for hire. This includes maintenance of pilot proficiency.

- Business Transportation--Any use of an aircraft, not for compensation or hire, by an individual for the purposes of transportation required by a business in which he or she is engaged.

- Executive/Corporate--Any use of an aircraft by a corporation, company or other organization for the purposes of transporting its employees and/or property not for compensation or hire and employing professional pilots for the operation of the aircraft. This includes maintenance of proficiency of the pilots employed by the company.

- Commuter Air Carrier--Any air taxi that performs under FAR Part 135, at least five scheduled round trips per week between two or more points, or who carries mail. This includes maintenance of pilot proficiency.

- Air Taxi--Use of an aircraft operating under Federal Aviation Regulations Part 135, passenger and cargo operations, including charter but excluding commuter air carrier. This includes maintenance of pilot proficiency.

- Instructional--Any use of an aircraft for the purposes of formal flight instruction with or without the flight instructor aboard. This excludes proficiency flying.

- Aerial Application--Any use of an aircraft for work purposes which concerns the production of foods, fibers, and health control in which the aircraft is used in lieu of farm implements or ground vehicles for the particular task accomplished. This includes fire fighting operations, the distribution of chemicals or seed in agriculture, reforestation, or insect control.

- Industrial/Special--Any use of an aircraft for specialized work allied with industrial activities. Examples include: pipeline patrol, survey, aerial advertising, fish spotting, aerial mapping/photography, helicopter hoist, towing gliders, search and rescue, hunting, highway traffic advisory, sightseeing, etc. This excludes transportation and aerial application.

- Other--Any use of an aircraft not included above. Examples include: research and development, experimentation, R&D, testing, government demonstrations, air shows, air racing, parachuting, sport, etc.